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State of Maine Comprehensive Energy Plan 2008-2009

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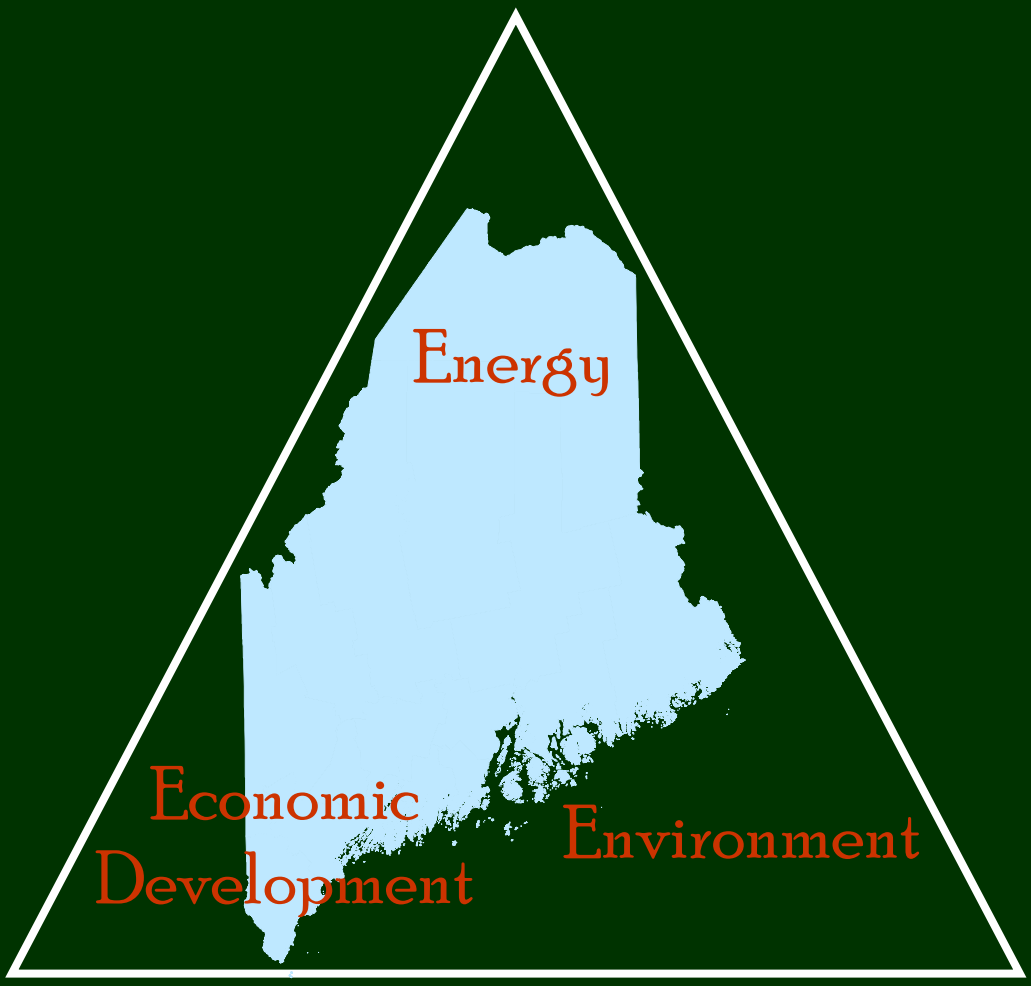

State of Maine Comprehensive Energy Plan 2008-2009

Governor's Office of Energy Independence and Security

Facilitating Public and Private Partnerships

John E. Baldacci
Governor
State of Maine

John M. Kerry
Director
Governor's Office of Energy
Independence and Security

January 15, 2009

STATE OF MAINE
OFFICE OF THE GOVERNOR
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JOHN ELIAS BALDACCI
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INDEPENDENCE AND SECURITY

STATE OF MAINE COMPREHENSIVE ENERGY PLAN

Letter of transmittal to the Maine Legislative Joint Standing Committee on Energy and Utilities

January 15, 2009

Dear Senator Hobbins and Representative Hinck:

Our nation, region and state have become dangerously dependent on unreliable, insecure and expensive foreign oil and natural gas. Combustion of these fossil fuels causes climate change, damages the environment, threatens public health, undermines our economic vitality, erodes national security and diminishes our quality of life. As we saw from the rapid rise in energy prices to historic levels in 2008 and as benchmark crude oil traded at a high $147 a barrel on the New York Mercantile Exchange, these stark energy, environmental and economic realities have dramatically increased the vulnerability of Maine citizens.

As you know, as a result of Maine's continuing dependence on expensive, volatile and unreliable foreign fossil fuels for heating our homes, powering our businesses and fueling our cars, trucks, trains and boats, Maine exports billions of dollars out of the state each year. Accordingly, the citizens of Maine are increasingly becoming more vulnerable to rapid price escalations, fossil fuel supply curtailments and infrastructure disruptions.

As you have noted, the State of Maine must reduce its inordinate dependence on foreign fossil fuels such as oil and natural gas, while providing the vision and the leadership in the development of public/private partnerships that will enhance the State of Maine's goals of achieving economic prosperity, environmental integrity and energy security with clean, reliable, affordable, sustainable, and indigenous renewable resources. While the enclosed State of Maine Comprehensive Energy Action Plan identifies the principles, the timeframes, the organizational framework and the concrete steps necessary to advance your vision for an energy independent and secure state, it is imperative that the Legislature, utility regulators, energy industries and all other citizens, businesses and industries in the state unite to create a clean, affordable, sustainable and secure energy future.

Accordingly, the Governor's Office of Energy Independence and Security, in accordance with Public Law 656 of 2008, is pleased to transmit to you the 2008-2009 State of Maine Comprehensive Energy Plan.

Respectfully submitted,

John M. Kerry

John M. Kerry, Director,
Governor's Office of Energy Independence and Security

PHONE: (207) 287-3292

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C. Develop an interdisciplinary energy SWAT team to assist large industries and manufacturers in addressing their critical energy needs.
D. Work with State Government to adopt an overall energy reduction goal at State facilities.
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F. Continue to promote increased efficiency standards for all new construction.
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G. Encourage the development of ethanol-blend fueling stations.
H. Increase the development and use of cogeneration and tri-generation in the State of Maine.
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And, finally, I would like to thank David Cole, Commissioner, Department of Transportation, and Gregory Nadeau, Deputy Commissioner, DOT, for arranging for the printing of the plan.

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STATE OF MAINE COMPREHENSIVE ENERGY PLAN 2008-2009

Governor John E. Baldacci

EXECUTIVE SUMMARY:

Our nation, region and state have become dangerously dependent on unreliable, insecure and expensive foreign fossil fuel products. The wasteful and increasing consumption of foreign fossil fuel products contributes to environmental pollution and climate change, undermines our economic vitality, erodes our public health and diminishes the quality of life for all Maine citizens. This comprehensive energy plan charts a course to guide Maine to a secure energy future with affordable, reliable and clean energy supplies that are environmentally responsible and economically beneficial to Maine energy consumers and utility rate payers.

The Governor's Office of Energy Independence and Security (OEIS), pursuant to the vision of the Governor and the provisions of the recently enacted Public Law 656, 2008 which directs the OEIS to develop a Comprehensive Energy Action Plan (Plan) for the State of Maine, is committed to advancing the principles, the programs and the integrated plans necessary to secure a safe, clean and affordable energy future for the citizens of Maine. This inaugural state energy plan is based on the following energy, economic development and environmental principles:

PRINCIPLES FRAMING MAINE'S COMPREHENSIVE ENERGY POLICY:

1. Competitively priced energy is vital to the state's economy and the well-being of our citizens. Maine should strive to provide energy to all its citizens at the lowest possible cost to promote economic development and to retain jobs;
2. Maine should increase its energy independence, security, service quality and reliability through greater reliance on cost-effective energy efficiency, conservation, demand management and distributed resources in all energy-using sectors;
3. Maine's energy policy ultimately relies on the health of competitive markets;

4. When barriers prevent the effective operation of energy markets or when these markets do not take the long-term societal and environmental impacts of energy decisions into account, the State should look to other tools to achieve its goals, including: regulation, education, taxation policies, subsidies and leadership by example;
5. An adequate and reliable energy delivery infrastructure is critical to economic growth and to continued expansion of competitive energy markets;
6. Maine should continue to support indigenous renewable energy resources in all energy using sectors to ensure that Maine participates in an effective manner in national and international efforts to promote energy security, independence, diversity and long-term sustainability;
7. State policies should seek to minimize the unnecessary environmental and public health impacts of energy production, distribution and use;
8. State Government should lead by example and action in its energy procurement, infrastructure and usage practices and policies;
9. Maine people should have access to adequate information on the costs, environmental and other impacts of their own energy choices to ensure that they can make more informed decisions; and
10. Active interagency coordination on state, regional and federal energy policies offers many opportunities to make more economically efficient, environmentally responsible and energy secure decisions regarding the use of State energy resources.

To realize the long-term goals contemplated by the these principles, it is essential that we enhance the common good of our communities and state by entering into a public-private partnership with energy consumers as well as the individuals and companies that produce, transmit and distribute energy in the state of Maine. It is imperative that all Maine citizens, especially legislators, energy consumer advocates, public utilities, state policy-makers, administrators and regulators work together to develop a unified vision, mission and comprehensive plan to achieve energy independence and security for our families, businesses and industries, as soon as possible.

Building a secure and independent energy future will require not only long-term planning and foresight, but immediate investments that will help reduce our energy costs in the short-term. These strategic investments will create jobs, expand clean energy businesses and firmly establish the green energy industry as an economic development building block for our State's nearly $40 billion economy.

In addition to developing a 21st Century energy transmission infrastructure, strengthening the State of Maine's economy and enhancing our environment, implementing this innovative, integrated and comprehensive energy plan will place Maine at the forefront of the global and national movements to address the high costs of energy and the deleterious impacts of climate change. The Plan, if properly implemented and sustainably funded by public and private financial resources, will not only reduce the pace and percentage

growth of energy costs to Maine energy consumers, it should mitigate the impact of the volatile energy markets in our state and region.

VISION:

To provide leadership in the development of public and private partnerships that aspire to achieve the State of Maine's goals of energy independence and security with clean, reliable, affordable, sustainable, indigenous and renewable resources.

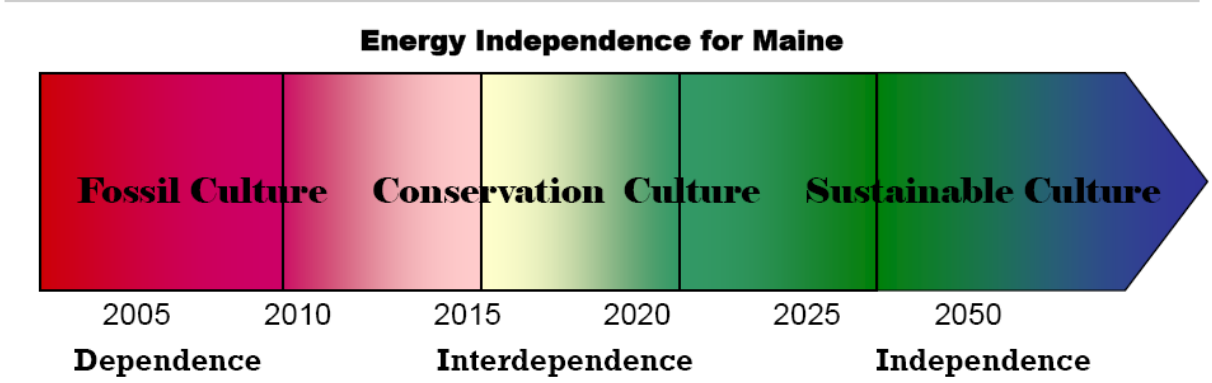
MISSION:

In conjunction with other departments of state government, the legislature, private industries and nonprofit institutions, provide an open, transparent and collaborative decision-making environment to create effective public/private partnerships that advance the achievement of energy independence, while optimizing Maine's energy security, economic vitality and environmental integrity.

PURPOSE:

The purpose of the Plan is to chart the course to a more secure, affordable and sustainable energy future for all Maine citizens, families and businesses and builds upon existing successes. It provides the governor, the legislature, the local governments, the public utilities, the private energy industry and energy consumers with a clear understanding of the state's plans, processes, priorities, programs and timeframes to address the critical energy issues of the first fifty years of the 21st Century. In addition to providing the vision, mission, and data on the energy resources and energy infrastructure in the state, the plan identifies the need for public and private entities to be engaged in the energy industry at the international, national, regional, state and local levels.

CREATING A CLEAN AND SUSTAINABLE ENERGY CULTURE:



The OEIS recognizes that building a sustainable, affordable, clean and secure energy culture is a process and not an event. Accordingly, the OEIS is advancing those values, principles, and policies that promote the integration of sound economic, energy and

environmental programs in a long-term, sustainable energy culture. To realize these ambitious and challenging goals, state policy-makers, department heads and state regulators must clearly and boldly enshrine in statute and institutionalize in practice, energy norms and standards that promote the long-term energy security of the state. In essence, the Plan for the State of Maine promotes a public private partnership to create a new energy ethic, which will transform an energy inefficient and consumption-driven culture into a more efficient and sustainable energy culture. Accordingly, the state must establish policies and implement programs that assist private businesses and industries to evolve from a fossil fuel dominated culture, to a sustainable energy culture based on energy efficiency, conservation and renewable resources.

While the Plan envisions a twenty-five to fifty-year planning horizon, it recommends that both the public and private sectors assert strong leadership and take immediate action to create the energy investment environment for private enterprise to invest billions of dollars in developing Maine's energy service centers and energy transmission corridors. This goal can be realized by creating "energy clusters", modernizing old energy plants, and expanding and upgrading aging transmission lines and infrastructure. The development of strategic "energy clusters" and the modernization of the electricity and natural gas transmission systems will not only create jobs and infuse billions of dollars into Maine's economy, these initiatives will enhance the state's long-term energy security and reliability.

While promoting policies to enhance economic development, energy efficiency and controlling energy costs for rate-payers and energy consumers, the plan strongly promotes private investments and technological initiatives to modernize our state inter-modal transportation, electrical, petroleum and natural gas transmission systems. This will not only assist in harnessing remote renewable resources to meet the Regional Greenhouse Gas Initiative's (RGGI) carbon reduction goals, it will provide for affordable, safe and secure energy as we transition from a fossil fuel culture to a clean, renewable and sustainable energy culture.

GLOBAL CONTEXT:

According to the Energy Information Administration (EIA) world energy consumption is projected to increase by nearly 60% by 2030. Total world energy use is projected to rise from 350 quadrillion BTUs in 2005 to 460 quadrillion BTUs in 2015, to 700 quadrillion BTUs in 2030. Global energy demand is projected to rise despite the volatility in world oil and natural gas prices.

The most rapid growth in energy demand from 2004-2030 is projected for nations outside the Organization for Economic Cooperation and Development (OECD), the so-called non-OECD nations such as China and India. Total non-OECD nations' energy demand increases a dramatic 95%, as compared with an increase of 24% in OECD nations, which primarily includes the United States, Canada and Western Europe. The robust demand for energy in non-OECD nations is largely the result of strong economic growth and increases in the population. The non-OECD regions combined economic activity, measured by GDP and purchasing power, increases by 5.3% per year, as compared with an average 2.5% per year growth for the OECD economies.

In the OECD region, where energy markets are well established, demand for energy in each of the end-use sectors such as industrial, residential building, commercial, transportation and utility infrastructure grows more slowly than in the non-OECD nations. As population growth declines and environmental concerns about global warming increases in the OECD nations, investors are attracted to the non-OECD nations where population growth-driven demand for energy and fewer environmental constraints exist. In 1980, OECD nations accounted for 52% of the world' industrial sector energy use. In 2004, the OECD countries share had fallen to 44% and it is projected to decline to 33% in 2030, as nations such as China, India and Brazil increase their economic development and energy demand.

According to EIA, world consumption of energy from all primary sources will increase by nearly 60% by 2030. Fossil fuels (primarily crude oil, natural gas and coal) will continue to supply much of the energy used world-wide. World use of petroleum and other fossil-fuel derived liquids (coal-to-liquid and natural gas-to-liquid) is anticipated to grow from approximately 86 million barrels per day (MB/d) to nearly 120 MB/d in 2030. Accordingly, unless there is a dramatic cultural shift in energy demand patterns, crude oil and other fossil-fuel derived liquids and gases will continue to provide nearly 66% of all world energy sources and remain the dominant fuels for the transportation and industrial sectors through 2030. While unconventional liquid fuels such as biogas, ethanol, and bio-oils are projected to increase from 2.6 MB/d to over 10 MB/D, they will only represent 1% to 2% of the total world energy resources.

Natural gas consumption is projected to increase by 1.9% a yr, from a world total in 2004 of about 100 trillion cubic feet in 2004 to about 160 trillion cubic feet in 2030. It is anticipated that the demand for natural gas will rise in the industrial, utility and commercial sectors as the price of crude and refined oil products increases in the coming decades. Higher natural gas prices will make coal more competitive in the world economy, especially in the electric generation sector. Currently, the industrial and utility sectors consume more than 50 % of the natural gas production.

Coal is the fastest-growing energy source worldwide, according to the EIA's 2007 Energy Outlook. The electric power and the industrial sectors account for nearly 100% of the coal consumption in the world. It has been reported that China is building one new coal plant every week to generate electricity. As non-OECD nations, such as China and

India, continue to grow at double digit rates, coal's share of the total world energy's use will increase from 26% to nearly 30% by 2030.

World electricity generation is projected to grow by nearly 90%, from 17 billion kilowatt hours in 2004 to nearly 30 billion kilowatt hours in 2030. Once again, most of the projected increase in electricity demand is in the expanding economies of the non-OECD nations. It is anticipated electricity generation will increase on average by 3.5% per year in the non-OECD nations, compared to only 1.3% in the OECD nations. It is significant from both an energy and environmental perspective that fossil fuels, especially coal and natural gas, will continue be the dominate fuels in the utility sector, providing more than 80% of the primary fuels to the industry world-wide.

As fossil fuel prices and environmental concerns increase, interest in generating electricity from nuclear power also increases. Nuclear power generation is projected to increase from 2,619 billion kilowatt hours in 2004 to nearly 3,620 billion kilowatt hours in 2030. Higher fossil fuel prices, energy security concerns, improved reactor designs, and environmental considerations are expected to improve the prospects for new nuclear power capacity in many parts of the world. While nuclear power generation is expected to decline in Western Europe, the non-OECD nations, especially in Asia, are expected to increase nuclear power generation between 4%-6% per annum.

Global grid-connected renewable energy resources are expected to expand between 1%-2% world-wide between 2004 and 2030. Higher fossil fuel prices, particularly for natural gas in the electric power sector, allow renewable resources such as hydro-power, solar, wind, geothermal, waste-to-energy, biomass and ethanol to compete economically with fossil fuels. While large-scale hydro-projects in South America and Canada, and wind farms are increasing throughout the world the world-wide renewable resource portfolio is projected to only grow from 7% to 8%. Obviously, this scenario could change dramatically if there is a quantum shift in public attitudes regarding climate change and significant increases in energy efficiency and conservation technologies.

Although oil prices and energy demand have fallen recently due to the downturn in the economies of most nations, it is safe to say that prices will continue to rise and demand will increase once the world's economic engines begin to expand.

In recent years, atmospheric concentrations of carbon dioxide and other greenhouse gases (GHG) have been increasing at a rate of about 0.5% per year. Because anthropogenic (human caused) emissions of carbon dioxide result primarily from the combustion of fossil fuels for energy, energy, especially public utility and open-market generated electricity, has emerged in the center of the GHG and climate change debate. According to EIA, without dramatic world-wide intervention, world carbon dioxide emissions will continue to increase steadily from approximately 25 billion metric tons in 2004 to approximately 45 billion metric tons in 2030.

From 2003 to 2004, carbon dioxide emissions from non-OECD nations grew by almost 10%, largely because of a near 20% increase in the use of coal in non-OECD countries in

Asia, especially China and India; while emissions in OECD nations only grew by 2% due to increased environmental concerns, climate change and GHG regulations. It is significant to note, in 2004, non-OECD countries emitted more carbon dioxide than OECD nations; this trend is projected to grow significantly in the next 25 years. In 2030, non-OECD nations are anticipated to emit 50% more carbon dioxide than the OECD nations, which includes the United States, Canada and Western Europe.

REGIONAL CONTEXT:

In January 2008, Governor John E. Baldacci assumed the Chairmanship of the New England Governors' Conference Inc. (NEGC) and the Co-Chairmanship of the Conference of New England Governors and Eastern Canadian Premiers (NEG/ECP). In September, 2008, Governor Baldacci hosted the 32nd NEG/ECP Conference in Bar Harbor. The Governor has made it clear that energy independence and security are critical to the economic well-being of our state and region and he has placed energy at the top of the New England Governors' public policy agenda.

The organizational framework of the NEGC enables the Governor of Maine to work collaboratively with other New England governors to address critical energy, economic development, transportation and environmental issues on the international, national, regional and state levels. For example, in March, 2008 Governor Baldacci, as Chairman of the NEGC, called for a July, 2008 meeting of the governors to discuss:

1) The gasoline, diesel and heating oil crisis in New England;
2) Regional renewable power options;
3) Approaches to expanding energy power trades with Eastern Canada;
4) Concerns regarding transmission infrastructure and electricity transmission cost allocation issues; and
5) Governance and structural issues related to the Independent System Operator in New England (ISO-New England) and NEPOOL.

To accomplish the goals of the NEGC, the governors have established several interrelated energy and environmental committees: the Power Planning Committee; the Committee on the Environment; the Energy Monitoring/Winter Fuels Group; the Transportation and Environmental Committee; the Northeast International Committee on Energy (NICE) and recently the NEGC Energy Initiative Working Group, which was directed to craft a set of guiding principles to create a common energy vision for the New England States. All of these committees work collaboratively with the private and public sectors and our Canadian counterparts from the Eastern Provinces and Atlantic Canada. This collaborative effort can best be summarized by the NEGC's Resolution adopted at the Bar Harbor Conference in September:

"We continue to support strongly the development of renewable power generation and cost-effective transmission in New England and adjacent areas (New York and the Eastern Canadian Provinces). We recognize as well that cost-effective renewable resources that are distant from load centers (Boston, Hartford, Southern Connecticut) are

likely to play an important role in addressing our region's future energy and environmental challenges and the New England states should work together to review and understand such opportunities. Accordingly, we commit to cooperate as a region to resolve any differences that may exist among us that would impede the development of cost-effective renewable resources." (September, 2008 Bar Harbor, Maine)

It is anticipated that the NEGC Energy Initiative Working Group will be making recommendations regarding their progress on identifying critical principles for framing a common energy vision for New England prior to the Governors' meeting in February, 2009.

In May, 2008, the NICE Committee convened an "energy dialogue" to explore economic opportunities and to assess the economic, political, regulatory and legal barriers to regional and cross-border electricity and energy trade between Eastern Canada and the New England States. The "energy" dialogue included representatives from all the states and all of the provinces; energy industry representatives; government regulators; private energy developers; transmission and distribution utilities; and members of both Canadian and U.S. Independent System Operators (ISO). The ISOs manage the electrical transmission systems, perform system planning and administer the whole sale electricity markets in both the U.S. and Canada.

The conference discussed previously articulated and adopted NEG/ECP ministerial policies such as:

> (1) Energy efficiency should be the first step taken for environmental protection, energy security and economic development;
> (2) Our region (Northeast, New England and Eastern Canada) needs to make economic development choices and pursue energy and environmental policies that significantly reduce our carbon emissions;
> (3) Long-term contract mechanisms may facilitate transmission line development and renewable resource investments that would not otherwise be economically or politically feasible; and
> (4) Opportunities for supporting economic trade should be expanded.

A critical component of Maine's energy framework is the state's relationship and membership in the ISO-New England consortium. ISO-New England is the administrator of the bulk electricity transmission system, the bulk electricity system's comprehensive planner and the administrator of the wholesale electricity market in New England. Since the deregulation of the wholesale and retail electricity markets throughout New England in the late 1990s, the energy consumers, producers, transmitters and distributors of electricity have been struggling to evaluate the benefits and burdens of the electricity system's market transformations. Clearly, the results from deregulation and decoupling of electricity generation and transmission from the 100 year old vertically integrated electricity industry has been controversial and, in many observers' opinions, mixed at best.

Over the past several years, ISO-New England's strategic direction has become increasingly guided by concerns related to New England's dependency on natural gas and oil, transmission security, energy resource adequacy and the impact of environmental policy on system reliability and prices. Innovative environmental programs such as the RGGI, the various state Renewable Energy Credit programs (RECs) and the states' Renewable Portfolio Standards (RPS) are having a substantial impact on the energy generation, transmission and consumption markets.

While there are many differences of opinion about the proper path forward to address the above referenced concerns, ISO-New England has identified two primary themes it wishes to engage its many stakeholders in discussion;

(1) The first theme relates to the three levels of transmission investment priorities that the ISO has defined as:

a.) First, invest in reliability projects that are needed to keep the lights on in New England and meet national, ISO, and local reliability criteria;
b.) Second, invest in transmission projects within New England that may be necessary to integrate remote (Maine, Vermont and New Hampshire) renewable resources such as wind and biomass; and
c.) Third, invest in tie-line interconnection projects that may be necessary to bring additional renewable or non-carbon (nuclear) emitting power into New England from Eastern Canada and New York.

(2) The second theme is to explore the potential for improved coordination with the Eastern Canadian Provinces in order to maximize the capability of the larger region of New England, the Atlantic Provinces and Quebec to incorporate renewable and non-carbon emitting (nuclear) into the ISO-New England energy portfolio. ISO-New England asserts that a larger utility grid footprint (ISO-New England, Quebec-ISO and New Brunswick-ISO) would enhance the region's technical ability to integrate more intermittent wind into our electricity grid system.

Accordingly, ISO-New England is currently conferring with the Canadian ISOs and all appropriate stakeholders to further explore these two themes. This fact notwithstanding, on April 13, 2006, Governor Baldacci signed a Resolution "to direct the Maine Public Utilities Commission (MPUC) to Examine Continued Participation by Transmission and Distribution Utilities in the State in the New England Regional Transmission Organization." The Resolution required the MPUC to submit two reports to the Legislature: an Interim Report in January 2007 and a Final Report in January 2008.

The Final Report issued by the MPUC in January, 2008, identified a number of concerns with Maine's current electricity structure, including both its obligations within ISO-New England and the results of the deregulation of the electrical industry in Maine. In addition to raising concerns about New England's increasing dependence on natural gas, the report underscored the inequities in the cost allocation formula utilized by the ISO and the unfairness of the obligations allocated to Maine under the ISO-New England

Forward Capacity Market (FCM). The MPUC further identified concerns with the increases and volatility in wholesale electric prices and the increasing risk for electricity consumers and ratepayers.

In the Final Report, now being considered in a pending rate case before the MPUC, the MPUC identified three options for the Maine utilities to consider:

> 1) Should Maine remain a member of ISO-New England and seek internal reforms to address Maine's concerns?
> 2) Should Maine withdraw from ISO-New England and form a new inter-regional relationship with New Brunswick?
> 3) Should Maine withdraw from ISO-New England and form its own independent transmission company (ITC) and assume all the risks and rewards of planning, developing and administering an integrated bulk transmission system on a stand-alone basis?

Based on a recent MPUC decision directing the Maine utilities to continue negotiating with ISO-New England regarding Maine's concerns about the governance structure, transmission cost allocation process and the interim FCM formula, it is anticipated the MPUC decision regarding membership in the ISO-New England will be rendered sometime in June of 2009.

STATE CONTEXT:

MAINE'S CURRENT ENERGY POLICY AND PROGRAM SUCCESSES:

Maine is a national leader in the development of innovative energy programs and policies. In fact, Maine was the first state in the nation to implement an energy efficiency program and the first to pass legislation addressing global warming.
The State's current energy assistance programs include administering the Low Income Heating Energy Assistance Program (LIHEAP), which funds between 50,000-70,000 homes annually; the Keep ME Warm program that raises private funds for emergency heating oil assistance; and other energy auditing, weatherization and energy assistance educational programs.

The State's "Lead by Example" initiatives include purchasing 100% renewable electricity for state government operations paid for by energy conservation improvements in all state buildings; requiring the state to meet 30 mpg for passenger cars purchased for state use; reducing straight #2 heating fuel by about 13,000 gallons annually by the use of biodiesel on the Augusta campuses; requiring state buildings to incorporate LEED standards into the design, construction, operation and maintenance of any new, expanding or existing buildings; and Maine is increasing the number of efficient hybrid vehicles in the state fleet, with 90 hybrids to-date**.**

Since 2007, the Baldacci Administration has initiated and/or adopted a State of Maine Pre-Emergency Energy Plan, an Energy Emergency Management plan; participated in the

successful RGGI; the creation of the RGGI Energy and Carbon Savings Trust (E&CST); the Governor's Wind Task Force; the Energy Conservation Board; the Wood Optimization Panel; the Wood to Energy Task Force; enacted the Maine Uniform Building and Energy Codes; codified the Governor's Office of Energy Independence and Security in state statute; passage of a Climate Action Plan and a sign-on to the New England Governors' and Eastern Canadian Premiers (NEGC/ECP) climate agreement with a goal of reducing statewide greenhouse gas emission to 1990 levels by 2010; 100% below 1990 levels by 2020; and 75-85% reductions in the long-term; a Renewable Portfolio Standard that requires electricity providers to supply at least 30% of their total retail electric sales using renewable power with a goal of increasing new renewable energy capacity by 10% by 2017.

In relation to transportation, Maine has expanded its state rideshare, carpool and vanpool programs; adopted the California global warming tailpipe emission standards; and appropriated funds to expand the Downeaster passenger rail service Northward.

Currently, policy makers and regulators are reviewing existing net-metering and interconnection standards for distributed generation projects in order to promote the development of additional renewable power generation; the Governor has instituted an Ocean Energy Task Force to explore tidal and off-shore wind energy and Maine is participating in an effort to adopt a low-carbon fuel standard with ten other states

In addition, the MPUC currently administers "Efficiency Maine", the highly successful state-wide electricity energy efficiency program that helps residences, businesses and schools reduce electricity energy costs through energy audits, incentives and loans. Efficiency Maine also provides certification and training for energy auditors and weatherization contractors through the Maine Home Performance Program; administers a renewable energy program that includes solar and wind power rebates.
Overall, Efficiency Maine's electrical energy efficiency accomplishments in 2007 included:

- $101 million lifetime economic benefits for installed equipment
- 87,404 Megawatt hours in annual savings
- $3.85 to $1.00 program-wide benefit-cost ratio
- 669 business projects completed
- 3.0¢ per kilowatt hour for efficiency savings
- 788,125 compact fluorescent light bulbs (CFLs) rebated
- 497,491 metric tons of lifetime carbon dioxide (CO2) emission reduction

GOVERNOR BALDACCI'S 2008 SHORT-TERM ENERGY ACTION PLAN

In November, 2007, in response to rapidly rising transportation and heating oil prices, Governor Baldacci initiated the Governor's Pre-Emergency Energy Task Force (Task Force). The Governor re-assembled the Task Force in the summer of 2008 as oil hit an all-time high of $147 dollars per barrel. At the direction of the Governor, the OEIS, working with numerous state agencies, the utilities, consumers, businesses and charitable

organizations, implemented the following short-term plan to help Maine people and businesses cope with the unprecedented high cost of heating oil, gasoline and diesel fuel and to help them stay safe and warm during the winter of 2008-2009;

1. **Provide One-Stop Shopping for All Maine Energy Resources:** streamline all existing energy referral and information services into a one-stop shopping model with a single point of contact through Maine 2-1-1 in order to provide accurate and timely energy information and assistance to the public.

   Status:

   Enhanced Maine 2-1-1 referral system: on-line as of November 2nd, 2008 with additional staff to handle increased winter and emergency call volume. Also includes a "warm transfer" from 2-1-1 directly to state agencies when appropriate to answer citizen questions on energy.

2. **Expand Weatherization of Maine Residences:** Expand weatherization to Maine residences including distribution of "warm kits" before this winter in order to reduce energy consumption and lower household energy bills for low-income households.

   Status:

   2,000 "Keep ME Warm" Kits were distributed on October 25th to University of Maine Cooperative Extension Offices and the Department of Transportation (DOT) garage in Scarborough. Kits went to neighborhood volunteer teams on a first-come, first-served basis. The Governor personally helped install a kit for a family in Waterville.

   Increased weatherization funding by $2 million, expanding current program by about 500 homes. The new funding supplements an anticipated $6.5 million in weatherization funding, which will improve another 1,500 homes. Typical weatherization improvements can reduce fuel use by 20 percent.

   - **Curriculum was developed and trainings were scheduled for over 500 Weatherization Technicians** in collaboration with the technical and community colleges September through December, 2008.

   - **Certified Energy Auditor trainings** scheduled through December, 2008 were filled to capacity.

   An additional $1 million was invested in the Clean, Tune and Evaluate (CTE) program to make repairs to inefficient furnaces in an estimated 2,500 additional homes that are LIHEAP eligible. (Typical CTEs can reduce fuel use by 10 percent.)

3. **Increase Energy Audits of Homes and Businesses for all Maine People:** Provide a free, hands-on energy audit and weatherization training course to

hundreds of volunteers and energy service providers through the community college system and other media venues.

Status:

Governor's Weatherization Information and Training Session was held on October 1st, 2008 and was televised to all Maine Community College campuses. A video of the session is available on the Governor's website.

4. **Provide Statewide Education and Training for What Maine People Can Do Now to Prepare for the Upcoming Winter:** Use educational and outreach materials through a variety of media outlets, utilities, churches and fraternal organizations, to inform people about what action steps they should take now to weatherize their homes before winter arrives.

   Status:

   A **"Do it Yourself" Guide to Saving Money on Home Heating** was developed with 500,000 copies being distributed statewide and is also available to download from the Governor's energy web page at:
   http://www.maine.gov/governor/baldacci/policy/DIY%20Web%20v2.pdf

   A companion "Do It Yourself" video is available on the Governor's website as of October 25th, 2008 for free download.

5. **Expand Energy Efficiency Financing Tools for Hospitals, Schools, Nursing Homes, Municipalities, Social Service Agencies and Businesses:** Conduct outreach and education, provide technical expertise and facilitate energy audits for businesses while continuing energy financing programs for schools, nursing homes, municipalities and social service agencies.

   Status:

   Reserved $2 million of available funding at the Finance Authority of Maine (FAME) for eligible energy conservation and other energy projects for businesses in the State.

   - **$1 million for low-interest subordinate (gap) financing of energy projects for business** to remain viable and/or improve productivity. Applications for the Economic Recovery Loan Program are being accepted by FAME through March 31, 2009.

   - **$1 million for low-interest Energy Conservation Loans to help Maine businesses** improve workplace energy efficiencies. Applications are being accepted through March 31, 2009.

   - **Low interest loans for energy audit equipment** are available through private banks and credit unions for graduates of Maine State Housing

Authority (MSHA) energy auditor and weatherization technician classes.

6. **Increase Transportation Options and Reduce Fuel Consumption:** Expand existing alternative transportation programs like Go Maine, provide fuel wise tips, promote Free Fare Fridays, and implement transit-based strategies to reduce vehicle miles traveled.

   Status:

   Reprogrammed $1.01 million within the Department of Transportation to increase utilization of the GoMaine program, extends the "Free Fare Fridays" promotion, studies the State's Park & Ride network and improves access to rail services.

   - **Increased the GO Maine commuter database** to 7000 participants. Launched GO Maine web-based/real-time Trip Planner in November, 2008.

   - **Added 12 new GO Maine commuter vans** are available for service as of January, 2009.

   - **On-going alternative transportation outreach campaign** to generate greater awareness of Maine's carpool, vanpool, transit use and tax benefit opportunities including the launch of "Share Your Ride" statewide PSA's and new statewide radio campaign for the GO Maine program and the continuation of "Free Fare Fridays" on all Maine transit.

   - **Rail Access Programs implemented** to provide a local freight rail revolving loan program for owners of property adjacent to rail lines and rail access program for businesses in need of connections to rail.

7. **Keep People Warm and Secure in Their Homes This Winter and Beyond:** Local teams would assess local resources and needs, create an action plan for response and ensure neighbors help neighbors in keeping people safe, secure and warm this winter. The connection between rising fuel prices and the cost of food would be identified and purchase of local foods and local firewood resources for heating would be promoted.

   Status:

   Local teams have been developed and fundraising efforts undertaken across the State to monitor people in need and provide "neighbor-to-neighbor" assistance to keep people safe and secure in their homes.

An additional $4.25 million in state funding was allocated to increase the LIHEAP benefit. Maine has since received a total base grant of $80 million - the largest base LIHEAP grant ever received with an average benefit of $940.00.

A $3.25 million emergency fund has been proposed for January, 2009 to help families who either participate in LIHEAP or are slightly above the entitlement threshold in the event of a fuel oil emergency.

MAINE'S COMPREHENSIVE ENERGY ACTION PLAN:

While this plan is framed by a 50-year planning horizon, it outlines an immediate and clear path to a clean energy future that promotes economic development, creates jobs, protects the environment and enhances our energy security. The Plan, while charting the course towards energy independence, is a clear and unambiguous call to immediate action by all Maine citizens, businesses and industries.

Faced with unprecedented and historic spikes and volatility in energy costs, state policy makers, energy producers and consumers, utility executives, law makers and energy industry experts are all seeking solutions to the complex and multi-faceted challenges posed by Maine's inordinate dependence on foreign oil and other fossil fuel products.

In 2007, Maine residences and businesses were nearly 80% dependent on oil (the highest per capita in the nation) to heat our residences and effectively 100% dependent on petroleum products to fuel our rail, truck, bus, marine and automobile transportation fleets. In July, 2008, when the price of a barrel of foreign oil reached $147.00 on the NYMEX, it was estimated that the State of Maine, including public and private entities, would have spent and exported over $6.5 billion out of the state; this costs Maine jobs and investment capital for our businesses and industries. In addition, it reduces economic development opportunities for all Maine citizens, especially for our young men and women entering the work force. To put this number into context, the estimated total tax revenue for the State of Maine in 2008 was $3.04 billion dollars; this is less than half of the money (petrotax) we export out of the state each year to pay for petroleum products. (Source: Bureau of the Budget State of Maine.)

Accordingly, the critical action items in this Plan revolve around six overarching and interconnected strategies with accompanying goals, objectives and implementation measures:

1) Strengthening Energy Efficiency, Conservation and Weatherization
2) Fostering Renewable Energy
3) Improving Transportation and Fuel Efficiencies
4) Upgrading Electricity and Natural Gas Services, Transmission Systems and Transmission Infrastructures
5) State of Maine Leading by Example
6) Energy Emergency Preparedness and Response

I. STRENGTHENING ENERGY EFFICIENCY, CONSERVATION AND WEATHERIZATION

In a future that, in all likelihood, will include persistently high energy prices for all forms of energy, the most compelling and important strategy for increasing Maine's energy independence and security will be to implement all cost effective energy efficiency investments. This plan contemplates the forging of a new and sustained public/private partnership to create a sustainable energy culture based on substantial investments in energy efficiency and conservation preprograms and clean renewable resources and technologies.

Based on the persistent high costs of all forms of energy, it is clear that the status quo is patently unacceptable. These facts notwithstanding, it would be ill-advised to devise an energy plan that charts the course to energy independence and security without providing adequate funding or financial mechanisms to achieve those desirable goals.

Accordingly, the Plan recommends the following goals:

1) Achieve all cost-effective energy efficiency in the State of Maine.
2) Aggressively provide opportunities for State government, local governments, Maine families, businesses, and industry to invest in energy efficiency, conservation and weatherization through Federal and state programs, grants, loans and other public and private funding mechanisms.
3) Support and implement energy audits for businesses and state facilities.
4) Create an interdisciplinary energy SWAT team to assist large industries and manufacturers in addressing their critical energy needs.
5) Work with state government to adopt an overall energy reduction goal at State facilities.
6) Continue to promote increased efficiency standards for all new construction.
7) Encourage increased efficiency standards for heating systems and appliances.
8) Target weatherizing 100% of all Maine residences and 50% of all Maine businesses in the next 20 years.
9) Continue to promote and enhance training opportunities for certified energy auditors and weatherization technicians.
10) Reduce peak-load energy consumption in all sectors.

II. FOSTERING RENEWABLE ENERGY

While recognizing that the number one priority for Maine is achieving all cost-effective energy efficiency, we must also look to the future and foster renewable, indigenous energy sources like biomass; biofuels; on and offshore wind; solar; tidal power; geothermal and combined cooling heat and power systems.

To this effect, in 2007 and 2008, Governor Baldacci, established the Wind Power Task Force, the Ocean Energy Task Force, the Wood to Energy Task Force, and the Wood

Optimization Task Force to assess and identify renewable energy potential and opportunities in Maine's forests, rivers, mountains and ocean. These Task Forces have placed Maine in the forefront of wind and biomass power development in the region. In addition, these initiatives have resulted in a more streamlined state wind power application process, increased interdepartmental communication and collaboration on wind farm applications and increased efforts to balance economic development and environmental issues in both the public and private sectors.

Looking to the future, Maine is poised to develop 2,000 Megawatts of land-based wind by 2015 and nearly 3,000 Megawatts of on and off-shore wind by 2020. More significantly, it has been estimated that Maine's off-shore wind potential may yield well over 100,000 Megawatts of renewable wind resources in a few decades. Since Maine has only the need for 2,000 to 3,000 Megawatts to satisfy its current electricity capacity needs and peak electricity loads, off-shore wind could become one of Maine's most economically productive exports to other states and regions.

The development of renewable biofuels from indigenous renewable resources will be essential to reducing Maine's dependence on foreign petroleum products. While Maine is poised to make a major break-through on second generation biofuels from cellulose, much research and development remains to be done. The University of Maine is developing a process to make cellulosic ethanol from waste wood from the papermaking industry. A variety of entrepreneurs and inventors are engaged in research and development projects to turn restaurant grease, animal fats and other bio-waste products into biogases and other biofuels to heat homes and to supplement the state's vehicular transportation fleets.

The Plan encourages Maine citizens to assess their current energy, financial and environmental profiles and to select, when possible, an indigenous biofuel as an alternative to foreign petroleum products or other costly and environmentally harmful fossil fuels. These facts notwithstanding, the Governor established the Wood Optimization Task Force to ensure that Maine will continue to exercise prudence in the utilization of our wood resources and balance the need for renewable energy products with the continuing economic development concerns and wood resource needs for our forest products industries.

Harvesting the waste heat from electricity generation and reusing it to meet heating and cooling loads can increase energy production and utilization efficiencies by 20 to 40%. This not only saves money, it reduces green-house-gases, increases production efficiencies and saves jobs. While cogeneration has been utilized in the pulp and paper industries for years and the state has promoted cogeneration in public policies for over a decade, utility opposition, technical concerns and the lack of financial incentives has resulted in very few applications of this technology outside of the wood-products industry. This trend may change in the near or intermediate future as natural gas pipeline infrastructures expand and the cost of operating combined cycle natural gas turbines induces large institutions to invest in co-generation and tri-generation units. Accordingly, this plan calls for a concerted effort to identify, assess and remove

technical, regulatory, policy and economic barriers to the use of co-generation and tri-generation units.

Accordingly, the Plan recommends pursuing the following goals to achieve improvements in fostering renewable energy in the State:

1) Encourage Maine's businesses and residences to invest in distributed renewable generation of energy.
2) Continue to advance Maine's position as a leader in responsible wind power development and maximize the tangible benefits Maine people receive.
3) Work with State agencies, the Governor's Ocean Energy Task Force, Maine Maritime Academy (MMA) and private developers to promote tidal power in Maine.
4) Seek to develop on-site clean, renewable energy projects at appropriate state facilities.
5) Work with public and private schools across the state to facilitate energy alternative demonstration projects.
6) Support research at the University of Maine to create cellulosic ethanol from paper making waste.
7) Increase the use of bio-fuels and alternative energy in state-occupied buildings.
8) Encourage the development of ethanol-blend fueling stations.
Increase the development and use of cogeneration and tri-generation in the State of Maine.
9) Encourage the strategic location and development of industrial and district heating energy generation clusters.
10) Assist the University of Maine and other colleges with the use of bio-mass/bio-fuel cogeneration and tri-generation energy system
11) Increase the generation of renewable power into the State of Maine's electricity portfolio.

III. IMPROVING TRANSPORTATION AND FUEL EFFICIENCIES

Maine's transportation sector – particularly cars, light trucks, and SUVs – is responsible for more than one-third of the state's greenhouse gas emissions. Between 1985 and 2002, Maine's total annual vehicle-miles traveled increased from 9.4 billion miles to 14.7 billion miles, an increase of 56 % with nearly 80 % of Maine commuters traveling alone.

An added difficulty we face in Maine is the geographically dispersed, rural nature of the state. About 70 % of the growth in Maine during the past 15 years has occurred in rural areas which lengthens long-commute times and increases vehicle miles traveled and pollution.

Studies show that one of the best ways to reduce vehicle travel is to plan and build communities where people can access many different services, including jobs, while driving less. The evidence shows that implementing "smart growth" policies that encourage mixed-use, compact development reduces driving by 20 to 40 % and sometimes more. The Urban Land Institute found that, typically, Americans living in compact urban neighborhoods offering several transportation options drive a third fewer miles than those in automobile-

oriented suburbs. The study concludes that shifting 60 % of new growth to compact patterns would save 85 million tons of CO2 annually by 2030. The savings over that period equate to a 28 % increase in federal vehicle efficiency standards by 2020 (to 32 mpg).

In addition to reducing vehicle miles traveled, Maine should pursue expanding its alternative transportation networks and policies such as transit, rail, ridesharing, telecommuting, biking and waking to provide more efficient and less energy-intensive transportation options.
Maine has and continues to follow California's lead in adopting "clean car standards" including Global Warming Tailpipe Emission Standards that were adopted by Maine in 2006. Currently, Maine and a host of other states, are waiting on the U.S. Environmental Protection Agency (EPA) to issue a federal waiver to allow the stronger, state initiated global warming pollution standards to go into effect. With the coming change in the federal Administration, we anticipate the issuance of such a waiver to the State of Maine shortly.

Maine is also pursuing a low-carbon fuel standard (LCFS) with other states to further reduce greenhouse gas emissions and lower the carbon-intensity from the transportation sector. A LCFS is a market-based, technologically neutral policy to address the carbon content of fuels by requiring reductions in the average lifecycle GHG emissions per unit of useful energy.

Accordingly, the Plan recommends pursuing the following goals to achieve improvements in transportation and fuel efficiencies in the State:

1) Support and enhance state and private sector efforts for education and awareness of alternative transportation options and promotion of a low-carbon fuel standard and fuel efficient vehicles.
2) Support state transportation investments and encourage private investment for enhanced passenger and freight transportation systems.
3) Encourage greater coordination of land use and transportation policy to reduce vehicle miles traveled and decrease greenhouse gas emissions.
4) Support public-private partnerships to develop "explorer" transit systems for tourist destinations.

IV. UPGRADING ELECTRICITY AND NATURAL GAS SERVICES, TRANSMISSION SYSTEMS AND INFRASTRUCTURES

Albert Einstein once remarked, "Nothing rattles in the Universe, everything is connected". There is no issue more challenging to the development of this comprehensive and integrated energy plan than resolving the financial, regulatory and policy issues relating to energy transmission, especially electricity transmission. As was referenced above, due in substantial part to major policy and regulatory differences between Maine and ISO-New England relating to the cost allocation formulae and financial inequities in the ISO-New England's Tariff and market structures, the MPUC, the Governor and the Maine Legislature are in the process of assessing the pros and cons

of Maine remaining as a member of the ISO-New England consortium. It is anticipated that the MPUC will render its final decision regarding this issue in June, 2009 based on the outcome of negotiations.

Regardless of the outcome of the MPUC decision to direct the Maine utilities to remain in or get out of the ISO-New England system, the electricity transmission structure in Maine is over thirty years old and in need of major upgrades and expansion, especially if Maine consumers wish to take advantage of over 3,000 Megawatts of remote wind and other renewable energy resources in Western, Northern, Eastern and off-shore Maine.

In addition, as natural gas demand increases in Maine and Maine utilities and industries become more dependent on natural gas for the generation of electricity, it is clear that, in the near or intermediate future, natural gas producers, transmission owners and utilities will face increasing pressure to upgrade and expand the current Maritimes Northeast Pipeline that is so essential to the generation of electricity in Maine. This pressure to upgrade transmission lines will only grow if one of the proposed Liquefied Natural Gas (LNG) production and distribution facilities is approved along the eastern Maine coast or the LNG facility at Canaport in St John's, New Brunswick, is commissioned in the spring of 2009.

Accordingly, the Plan recommends pursuing the following goals to achieve improvements in upgrading electricity and natural gas services and transmission systems and infrastructure:

1) Support the development of electrical transmission projects in Maine for increased economic security, system reliability, decreased electricity costs for residents, businesses and industries and to accommodate new Maine-based wind power from both land-based and off-shore projects.
2) Support the development of electrical transmission projects in Maine to accommodate economically and environmentally sustainable renewable energy from Northern Maine and Canada.
3) Promote natural gas as a "transitional fuel" by expanding the natural gas infrastructure to all sectors in Maine.

V. STATE OF MAINE LEADING BY EXAMPLE

The State of Maine consistently "leads by example" when it comes to energy policy. From initiating the country's first energy efficiency program and global warming legislation, to purchasing 100% renewable power at state facilities and participating in the nation's first carbon-dioxide cap and trade program. Maine's programs and policies are not only models for other states; they are the driving forces in the market for energy efficient products and services in the state of Maine.

However, more work needs to be done. This Plan is the beginning of a long-term effort to achieve energy independence and security for all Maine citizens. The State should continue to lead by example instituting a performance-based, consistent and integrated

system for long-term energy planning. The OEIS is statutorily required to review and revise the State Comprehensive Energy Plan every two years to ensure that it will meet the goals, objectives and implementation measures included herein.

It is assumed that substantial policy changes will need to be enacted at the State and Federal levels for this Plan to be successful within the timeframes contemplated. The State, depending on available resources, should aggressively pursue the important policy changes necessary to realize the substantial benefits that energy independence and security provide.

Accordingly, the Plan recommends pursuing the following goals to achieve improvements in the State Leading by Example initiatives and achieving long-term energy planning and policy change:

1) Continue the "Lead by Example" initiatives in Maine by implementing progressive energy policies applicable to State, County and local governments.
2) Continue to plan for Maine's long term energy independence and security by using a 50-year planning horizon.

VI. ENERGY EMERGENCY PREPAREDNESS AND RESPONSE

The Energy Emergency Preparedness and Response Plan outlines the process to be followed by the State of Maine in the event of an actual or impending shortage of petroleum products, natural gas or electricity. An energy emergency process will facilitate:

1. Collection and analysis of information to evaluate the impacts of a situation.
2. Coordination and communication among public agencies and other entities with responsibility to energy emergency preparedness and response.
3. Identification and implementation of response activities appropriate to the circumstances.

Recognizing that energy situations are dynamic, this plan addresses the need for timely information and flexible responses It is intended only to guide the process of making effective use of available public and private resources in an energy emergency.

For planning purposes, the four phases of an emergency typically include mitigation, preparedness, response and recovery. This plan is focused on the preparedness and response phases of an energy emergency. Energy emergency preparedness depends on knowing who has what authorities, responsibilities and resources and how can those resources be brought to bear upon an emergency situation.

In an energy pre-emergency situation, the OEIS is responsible for coordinating the development of state energy policy, convening the Energy Resources Council to assess potential energy hazards or concerns and directing the development of a Pre-Emergency

Energy Management Plan. (Governor Baldacci adopted the Pre-Emergency Energy Management Plan in September, 2007)

However, once the Governor declares an energy emergency the responsibilities for addressing an energy emergency transitions from planning to response; the responsibility for coordinating these functions is transferred from the OEIS to the Maine Emergency Management Agency (MEMA). In accordance with the State of Maine Energy Emergency Management Plan (2007) MEMA will develop a response plan, convene an Energy Response Team and, contingent on the nature and scope of the energy emergency, convene a special energy task force comprised of public and private sector leaders to take all actions necessary to address the energy emergency.

STATE OF MAINE COMPREHENSIVE ENERGY ACTION PLAN 2008-2009

The following plan outlines the necessary action steps the State of Maine should consider implementing in order to achieve energy independence over the next 50 years. This Maine Comprehensive Energy Action Plan (Plan) consists of six main components:

1) Strengthening Energy Efficiency, Conservation and Weatherization;
2) Fostering Renewable Energy;
3) Improving Transportation and Fuel Efficiencies;
4) Upgrading Electricity and Natural Gas Services and Transmission Infrastructure;
5) State of Maine Leading by Example; and
6) Energy Emergency Preparedness and Response

The goal of the Plan is to chart a clear pathway to guide the State of Maine into a sustainable, reliable, secure, affordable, and environmentally responsible energy future. The OEIS is charged with the responsibility to develop the Plan, coordinate its implementation and revise it every two years.

I. STRENGTHENING ENERGY EFFICIENCY, CONSERVATION AND WEATHERIZATION

Goal:
Achieve all cost-effective energy efficiency in the State of Maine.

Objective:

Combine the energy efficiency programs of Efficiency Maine, the natural gas utilities, the RGGI and the Energy and Carbon Savings Trust (E&CST) into a single, "energy efficiency entity".

Implementation:

- Work with public and private stakeholders to create the best governance and organizational structures for the State's energy efficiency entity.
- Include a fuel-neutral efficiency program for all sectors of the economy that leverages existing and future public and private funding.
- Continue to leverage the RGGI E&CST proceeds to fund fuel neutral efficiency measures. (15% of total RGGI Trust funds available for fossil fuel efficiency.)
- Use a "one-stop shopping", fuel-neutral approach to designing the energy efficiency entity in order to administer all energy efficiency programs in the state of Maine based on the principles of:

    1. Being consumer oriented such that the process for participation and program design are targeted to serve multiple needs of the Maine energy consumer;

    2. Maximizing the effectiveness of programs by building up and centralizing expertise, addressing conflicts of interest, mitigating the influence of politics, promoting flexible, nimble program management, and providing a champion of funding cost-effective energy efficiency;

    3. Maximizing the efficiency with which programs are planned, designed, overseen, and delivered; and

    4. Providing sufficient checks and balances to ensure that there is accountability for meeting principles 1-3 and so that EE programs in Maine are sustainable for the long term.

Goal:

Aggressively provide opportunities for State government, local governments, Maine families, businesses, and industry to invest in energy efficiency, conservation and weatherization through Federal and state programs, grants, loans and other public and private funding mechanisms.

Objective:

Continue to identify and document existing energy efficiency programs and funding by maintaining a master database of state, federal and private sector grants, loans and other funding mechanisms.

Implementation:

- Research all state, federal and private funding programs for energy projects.
- Create database/spreadsheet defining funding by category, type and funds available.
- Research all tax incentives available from the State and Federal government.
- Create database/spreadsheet defining energy tax incentives and rebates by category, at both the State and Federal levels and make available on state agency websites for use by the public.
- Explore the possibilities for a major bond initiative or other funding mechanism to fund the energy efficiency entity and expand programs.
- Investigate different options to secure energy efficiency funding.

Goal:
Support and implement energy audits for businesses and state facilities.

Objective:

In conjunction with the State's energy efficiency entity, create a "Smart Energy" energy audit model for Maine businesses not covered by existing programs.

Implementation:

- Research available public and private funding sources for energy projects or audits.
- Apply for and obtain Federal "Save Energy NOW Program" (NOW) funding for business conservation/efficiency project
- Review DOE's NOW program and create streamlined template for businesses.
- Create "project criteria" logic diagram for each component of fast-track NOW plan
- Create a "go-no-go" template for energy project evaluations.
- Integrate any overlaps with Efficiency Maine and other state programs/models.
- Select ten Maine businesses to audit or use as beta sites for fast-track NOW audits.
- Create public / private partners for implementing projects that are a "go".

Goal:
Develop an interdisciplinary energy SWAT team to assist large industries and manufacturers in addressing their critical energy needs.

Objective:

In conjunction with the State's energy efficiency entity, create an Energy-SMART-Team for Maine businesses to address critical energy needs.

Implementation:

- Create a standardized template/program for a SMART-Energy-Audit for businesses.
- Create a handbook for SMART-Energy-Audit that can be used by any resource.
- Select one Maine business as a trial for the SMART-Energy-Audit program.
- Review process and results of findings and modify program as applicable.
- Automate model as much as possible.

Objective:

In conjunction with the State's energy efficiency entity create a web-based application that businesses can use for self-auditing.

Implementation:

- Take the final program and automate it for web-based application.
- Integrate into OEIS web-site for utilization by Maine businesses.
- Create tracking tool to identify businesses using the on-line resource.

Goal:

Work with State Government to adopt an overall energy reduction goal at State facilities.

Objective:

Work with State agencies to identify potential energy efficiency opportunities at State facilities.

Implementation:

- Quantify energy usage, costs and annual savings at all State facilities, universities and schools and report back to the Legislature annually.
- Develop an energy reduction plan and implement it to decrease overall energy usage at State facilities.
- Work with State Government to adopt wholesale power purchasing.
- Work with the State energy efficiency entity to create outreach materials for all school districts building new or upgrading facilities.
- Continue to work with the University of Maine and Maine Community College to decrease energy usage.

Goal:

Work with State Government to adopt an overall goal of new, renewable power generation at State facilities.

Objective:

Work with Bureau of General Services (BGS), Maine Department of Transportation (MDOT), Maine Department of Education (MDOE), and other relevant State agencies to develop an aggressive plan for investing in the generation of clean renewable power at State facilities.

Implementation:

- Create an up-to-date data-base of existing facilities and their energy profiles.
- Reduce the State Government's dependence on oil by expanding the use of biomass and biofuels at State facilities.
- Develop screening criteria for identifying appropriate projects.
- Continue effort to use biomass and "bio-oil" at certain State facilities.
- Continue efforts to site small wind, solar and geothermal energy systems at State facilities.
- Pursue implementing co-generation plants at State facilities.
- Seek a substantial increase in funding for renewable energy upgrades through a substantial bond issue or other funding mechanism.

Goal:

Continue to promote increased efficiency standards for all new construction.

Objective:

Support the Department of Public Safety and other relevant state agencies in the implementation of the newly enacted state wide energy and building codes.

Implementation:

- Work with and provide information to the Technical Building Codes and Standards Board in their effort to develop rules to resolve the conflicts between the Maine Uniform Building and Energy Code and the Fire and Life Safety Codes (Public Law Chapter 699, 2008.)
- Continue to evaluate and upgrade building codes and standards periodically to keep up with new technology and more efficient building techniques.

Goal:

Increase the number and availability of energy efficient heating systems and appliances in the State of Maine.

Objective:

Encourage increased efficiency standards for heating systems and appliances.

Implementation:

- Require all state agencies to purchase "Energy Star" appliances and equipment and include in state procurement specifications.
- Adopt through state rulemaking enhanced appliance standards for appliances and heating systems currently not covered by Federal standards.

Goal:

Target weatherizing 100% of all Maine residences and 50% of all Maine businesses in the next twenty years.

Objective:

Promote winterization and weatherization programs through the State's energy efficiency entity for Mainers of all incomes and housing types to weatherize homes and businesses in order to reduce fuel use and reduce heating costs.

Implementation:

- Continue the purchase and distribution of "winterization kits" by State government and non-profit organizations for use by low income households.
- Work with the Community Action Agencies, volunteers and Maine Cooperative Extension to identify people in need and use existing networks for distribution of kits.
- In conjunction with the State's energy efficiency entity, weatherize 100% of the 476,729 Maine singe family residences over the next twenty years by making bonding, system benefit charge funding, grants and loans available to all income groups for energy audits and weatherization upgrades.
- In conjunction with the State's energy efficiency entity, weatherize 100% of the 50,000 Maine multi-family residences over the next twenty years by making bonding, system benefit charge funding, and grants and loans available to owners and tenants of multi-family units.
- In conjunction with the State's energy efficiency entity, weatherize 50% of businesses and industrial facilities in Maine over the next twenty years by making bonding, system benefit charge funding, and grants and loans available to business and industrial facility owners.

Objective:

Expand reach of the State's Home Energy Loan Program (HELP).

Implementation:

- Identify and eliminate barriers to expanding the HELP program.
- Quantify the need for energy upgrades.
- Explore increasing the funding for HELP to meet the identified need through general fund bond issues or other funding mechanisms.
- Continue to streamline application process.
- Create a program where home improvement contractors can be pre-approved to market the loans at the point of the transaction.

Objective:

Continue and expand the State's "Clean Tune and Evaluate Program" in order to repair the oldest and most inefficient furnaces in low income homes.

Implementation:

- Continue to make referrals of eligible low-income households to participating fuel dealers to receive service.
- Continue to expand the pool of participating fuel dealers through additional outreach.

Goal:

Continue to promote and enhance training opportunities for certified energy auditors and weatherization technicians.

Objective:

Continue to increase the number of training courses for certified energy auditors.

Implementation:

- Determine need for additional energy auditors.
- Expand existing State-run energy auditor training programs.
- Combine existing State-run energy auditor training programs.
- Continue to work with the state's energy efficiency entity, Maine's Community College system, the Maine Homebuilders and Remodelers Association and private businesses to increase the number of energy audit training courses.

Objective:

Increase training for energy efficiency and weatherization service technicians.

Implementation:

- Determine need for additional energy efficiency and weatherization service technicians for residential, business and industrial sectors.
- Continue to conduct outreach to existing contractors to encourage them to undertake energy efficiency and weatherization work.
- Work with the MSHA, the MPUC, Efficiency Maine, Maine's Community College system, the Maine Homebuilders and Remodelers Association, and private businesses to increase the number of weatherization technician training courses.
- Investigate incentives for contractors to take energy education and curriculum training to switch to energy efficiency and weatherization work.

Goal: Reduce peak-load energy consumption in all sectors.

Objective:

Develop a plan to increase energy efficiency, conservation and to reduce peak-load energy consumption in existing and new state government buildings. (Resolve 183, 2008.)

Implementation:

- Work with BGS and other state agencies to issue a Request For Proposal (RFP) to procure a third-party energy response company to manage the state's demand response capabilities.
- Work with BGS and other state agencies to issue an RFP to procure a third-party energy response company to purchase wholesale power for State of Maine facilities.
- Submit a report by December 1, 2009 to the Utilities and Energy Committee that includes findings and recommendations and a plan for purchasing wholesale power and reducing peak consumption in state government buildings, together with any necessary implementing legislation. (Resolve 183, 2008.)
- Encourage the wide-spread use of demand response in government and the private sector through third party managers to decrease energy use and increase revenue streams.
- Expand participation from all sectors in regional demand response programs.
- Include "demand reduction induced price effect" when calculating energy efficiency program cost-effectiveness and the effects on overall pricing.

Objective:

Develop a plan to reduce peak-load energy consumption in residential, commercial, and industrial customers.

Implementation:

- Work with electric utilities to develop and implement demand response programs such as advanced metering.
- Continue to foster Maine's "ready to respond" capacity.
- Encourage large electricity users to establish "wholesale power purchase accounts".
- Reach out to all commercial, industrial and government customers with a peak demand of 500 kW or greater for participation in peak demand or third party management.
- Develop incentives for large commercial, industrial and government customers.
- Develop incentives for residential customers and customers with a demand of less than 500 kW.
- Determine which rate structures are cost effective to the rate payers.

- Monitor the results of all demand response initiatives through 2012 and implement the most effective mix of action steps in order to achieve a total peak demand goal by 2020.

II. FOSTERING RENEWABLE ENERGY (WIND, SOLAR, TIDAL AND GEOTHERMAL. COGENERATION/TRIGENERATION)

Goal:
Encourage Maine's businesses and residences to invest in distributed renewable generation of energy.

Objective:
Explore creating a "technology neutral" carbon offset incentive program.

Implementation:
- Inventory existing technology incentive programs and index carbon offsets to public grants.
- Create a technology matrix that indexes public grants to the amount of carbon a given technology avoids.

Objective:
Increase the amount of energy that can be credited to an individual or businesses' utility account to encourage private investment in distributed renewable energy.

Implementation:
- Work with the Maine Legislature to improve Maine's net metering law to allow for additional energy credits beyond the current twelve months, potential payments and raising the capacity limit to between 2-5 MW.
- Explore the technical and economic benefits of "feed-in tariff" policies.

Objective:
Standardize and streamline grid interconnection standards for distributed renewable energy applications.

Implementation:
- Continue to work with the MPUC as they investigate improving interconnection standards policy and procedures in Maine.
- Work with the Maine Legislature to pass an improved interconnection standard law as a result of MPUC recommended policy options.

Objective:
Increase the development and local ownership of "community energy" in the State.

Implementation:

- Adopt a generation goal for installation of new community energy in Maine.
- Create a plan for devising incentives, financing and education and outreach initiatives to promote community energy in Maine.
- Where applicable and in the public interest, give preference to community energy projects for interconnecting to the grid.

Objective:

Re-examine the possibility of implementing utility rate de-coupling to encourage distributed generation.

Implementation:

- Work with the Maine Legislature and the utilities to craft policies to conserve power and to create smart power grids.

Goal:

Continue to advance Maine's position as a leader in responsible wind power development and maximize the tangible benefits Maine people receive.

Objective:

Implement the Governor's Wind Power Task Force recommendations by seeking to host at least 2,000 megawatts (MW) of installed wind power capacity by 2015, at least 3,000 MW by 2020, with at least 300 MW of the 2020 goal achieved with projects built offshore.

Implementation:

- Track progress toward achievement of state wind energy goals.
- Conduct a full review of the status of meeting the 2015 wind power goals, and the likelihood of achieving the 2020 goals including permitting, technology trends, implementation success, progress toward meeting greenhouse gas emission goals, and identification of expedited permitting areas in LURC territory.
- Provide on-going recommendations to the Legislature regarding Maine's new wind power law, including any necessary appropriate revisions.
- Consideration of whether or not creation of an independent siting authority is advisable.
- Work with other State agencies to clarify the benefits of wind power projects and document each wind power project's economic and other benefits.
- Provide a clearinghouse and outreach capability to provide information to the public on current and developing wind technology, available grants, consultants with special expertise, and lists of wind equipment providers.
- Aggressively pursue development of Maine's offshore wind potential.

- Coordinate with other state agencies to track technical advances in the wind energy industry with an eye toward potential regulatory and/or policy implications.

Objective:

Continue working to provide financial incentives for the development of wind power in Maine.

Implementation:

- Continue funding the wind power rebate program and wind power pilot project to provide incentives to homeowners and small businesses to develop micro-wind power in Maine.
- Work with the Legislature to provide Business Equipment Tax Rebate (BETR) treatment for wind generating equipment above the appliance size.
- Work with the Maine Revenue Service and the Legislature to provide a sales tax exemption for all small and community wind power equipment.
- Work with Maine's Congressional delegation to secure extension of the federal wind production credit.

Objective:

Determine opportunities for the development of wind power by the State's agencies, political subdivisions, and rural electric cooperatives. (Public Law 671, 2008.)

Implementation:

- Monitor developments in technology in state and federal law to determine wind power opportunities for the above jurisdictions.
- Inform the Energy Resources Council of findings.
- Develop information resources to asst the State's political subdivisions, rural electric cooperatives, and other municipal entities to develop, design, construct, install and finance wind and other renewable electricity generation projects.
- Form one or more advisory groups to advise OEIS in undertaking the above responsibilities.
- Report to the Utilities and Energy Committee annually of the OEIS' progress on the above implementation measures and provide a recommendation on potential legislation to continue these efforts.

Objective:

Work with the Governor's Ocean Energy Task Force, (OETF) relevant state agencies and private developers to foster education, awareness of and advocacy support for near-shore and off-shore wind power development in Maine.

Implementation:

- Participate in the Governor's OETF with the purpose of exploring opportunities for near-shore and off-shore wind development and making recommendations to streamline the regulatory process.

- Work with relevant state agencies to promote the June, 2009 Ocean Energy Conference to be held in Maine.
- Partner with the University of Maine, Orono, non-profit organizations and the private sector to foster short-term opportunities for the development of near-shore wind power development.

Goal:
Work with State agencies, the Governor's Ocean Energy Task Force, Maine Maritime Academy (MMA) and private developers to promote tidal power in Maine.

Objective:
Coordinate with the Governor's Ocean Energy Task Force and relevant state agencies to review available research on "tidal technologies" and create a decision chart for applications.

Implementation:
- Research and compile data on large-scale tidal technologies.
- Research and compile data on medium-scale tidal technologies.
- Research and compile data on micro-scale tidal technologies.
- Create a suitability-to-application chart for tidal technology in Maine.
- Create permitting process primer.
- Create a listing of public funding opportunities for tidal technology in Maine.

Objective:
Coordinate with Maine Maritime Academy on the Tidal Device Evaluation Center's (TEDEC) proposed project in Castine, Maine.

Implementation:
- Participate in TEDEC's Working Group.
- Work with tidal power developers to identify appropriate technologies and sites for tidal power projects in Maine.

Objective:
Create economic impact overview for tidal power development in Maine.

Implementation:
- Coordinate with MMA on research and certification program (DOE and private funding).
- Promote manufacturing sector of tidal power technologies.
- Establish Maine as a leader in tidal power technology certifications.
- Establish Maine as a leader in tidal power consulting services and research and development.

Objective:

Create public private partnerships in Maine with national and international tidal power companies.

Implementation:

- Where feasible, list all companies investing in tidal power in North America.
- Explore the creation of a tidal power manufacturing sector in Maine.
- MMA research and certification program (DOE and private funding).
- Establish Maine as a leader in tidal power technology certifications.
- Establish Maine as a leader in tidal power consulting services and research and development.

Goal:

Seek to develop on-site clean, renewable energy projects at appropriate state facilities.

Objective:

Work with BGS, MDOE, MDOT, DOC and other state agencies to develop an aggressive plan for investing in clean renewable power at state facilities.

Implementation:

- Create an up-to-date data-base of existing facilities and their energy profiles.
- Develop screening criteria for identifying appropriate projects.
- Seek a dramatic increase in funding for energy upgrades through a substantial bond issue or systems or other funding mechanism.

Objective:

Continue to work with BGS, Department of Corrections and other state agencies to select a site suitable for micro-wind power.

Implementation:

- Obtain site plan for and determine best location for micro-wind site.
- Collect technical data for selected site including power interconnection and layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Objective:

Work with BGS and other state agencies to select a site suitable for solar thermal application.

Implementation:

- Obtain site plan for and determine best location for solar thermal site.
- Collect technical data for selected site including power interconnection and layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Objective:

Work with BGS and other state agencies to select a site suitable for geothermal energy application.

Implementation:

- Obtain site plan for and determine best location for geothermal site.
- Collect technical data for selected site including power interconnection and layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Objective:

Coordinate with the Department of Environmental Protection (DEP) and other state agencies to lead a stakeholder group to identify potential areas of concern with regard to groundwater and surface water resources from potential sources of pollution related to geothermal siting and operations.

Implementation:

- Include representatives of the geothermal design, installation, and well drilling industries, the Maine Groundwater Association, and other appropriate parties.
- Identify areas of concern in the potential siting and operation of geothermal heating systems.
- Explore and consider statutory changes to the responsibilities of the Well Drillers' Commission, current DEP rules, and the establishment of standards and guidance for future geothermal development.

Objective:

Investigate the integration of carbon sequestration technology at a state facility.

Implementation:

- Select one state facility in Augusta and obtain all process and technical data.
  - -- Boiler nameplate
  - -- Fuel: Type and quantity
  - -- Stack data and physical sight equipment footprints

- Pre-engineer the chosen site for installation of carbon sequestration technology.
- Create and issue a project proposal for application including carbon credits.
- Implement the project and monitor emissions performance.

Goal:
Work with public and private schools across the state to facilitate energy alternative demonstration projects.

Objective:
Work with the BGS and Maine School District Superintendents to create a grant program to be housed in the new energy efficiency, conservation and weatherization entity for energy upgrades for public and private schools to upgrade their energy systems.

Implementation:
- Create a master database of schools and their energy profiles.
- Create a prioritization matrix for energy upgrades.
- Secure funding for grant program through energy efficiency entity.

Objective:
Remove outdated regulations that stand as barriers to alternative energy projects in schools.

Implementation:
- Work with BGS staff and school facilities directors to understand regulatory environment.
- Work with the Fire Marshal and the office of financial regulation to understand intent behind regulation.
- Create legislative recommendations to modernize regulator environment.

Objective:
Perform research to determine one Maine school suitable for wood chips/wood pellets.

Implementation:
- Obtain technical and energy data from school selected.
- Perform site audit to obtain site specific technical data and physical layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Objective:
Perform research to determine one Maine school suitable for geothermal energy.

Implementation:

- Obtain technical and energy data from school selected.
- Perform site audit to obtain site specific technical data and physical layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Goal:

Support research at the University of Maine to create cellulosic ethanol from paper making waste.

Objective:

Strengthen the relationship with the University of Maine and their partnership with private companies in the development of ethanol from paper making waste.

Implementation:

- Coordinate resources for research endeavors with State and Federal agencies.
- Foster public/private sector partnerships/alliance for ethanol from pulp project.
- Support existing funding resources from Federal, State and private sector that support the Universities' efforts on the ethanol from pulp project.

Goal:

Assist in the development of "bio-fuel" and "bio-mass" energy plants using Maine renewable resources.

Objective:

Continue working with biomass and bio-oil companies on pilot projects.

Implementation:

- Continue working with biomass and bio-oil companies and collaborate on efforts for Maine.
- Create an action plan for biomass and bio-oil "off-take" projects in Maine and coordinate a site visit to biomass and bio-oil refineries with state and business leaders.
- Coordinate with the private sector regarding bio-oil transportation and distribution.
- Create project lists for fuel-oil to biomass or bio-oil conversions at State facilities.
- Prioritize the list.
- Research and coordinate DOE funding for piping retrofits.
- Create detailed project implementation schedule for all approved projects.

- Create and facilitate measurement and verification protocol for savings and emissions.

Objective:

Work with the DOC regarding biomass and bio-oil refineries using indigenous Maine fiber.

Implementation:

- Work with DOC regarding a biomass and bio-oil refinery.
- Obtain all metrics for state owned woodlands considered for refinery fiber.
- Present project model to biomass and bio-oil companies for evaluation of potential State bio-mass and bio-oil refinery.

Objective:

Select a Maine State facility to switch to 100% biomass or bio-oil for heating.

Implementation:

- Continue working with BGS to select state facilities for migration from fuel-oil to biomass or bio-oil for heating.
- Obtain existing fuel oil usage data and physical plant data.
- Perform site audit to obtain site specific technical data and physical layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Objective:

Select a Maine State facility to switch bio-mass tri-generation or cogeneration.

Implementation:

- Work with BGS to select one state facility that is suitable for bio-mass energy projects.
- Perform site audit to obtain site specific technical data and physical layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Objective:

Encourage private sector investment in bio-mass tri-generation or cogeneration facilities.

Implementation:

- Research and determine one private sector application for bio-mass tri-generation.
- Perform site audit to obtain site specific technical data and physical layouts.

- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Objective:

Research and create a pilot project for a neighborhood to convert from fuel oil to bio-mass or bio-oil.

Implementation:

- Research and identify a Maine neighborhood pilot project for biomass or bio-oil conversion.
- Create action plan for neighborhood bio-oil conversion.
- Facilitate stake-holders roundtable to discuss action plan for conversion to bio-oil.
- Perform site audit to obtain site specific technical data and physical layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by stake holders and homeowners.

Goal:

Increase use of bio-fuels and alternative energy in state-occupied buildings.

Objective:

Continue working with BGS and other relevant state agencies to monitor one state building's use of and eventual conversion to biomass or bio-oil.

Implementation:

- Continue discussions between biomass or bio-oil vendor and BGS staff.
- Work with BGS and other relevant state agencies to develop detailed scope of work and budget for biomass or bio-oil retrofit project.
- Obtain five years of fuel usage, electric usage, degree days and occupancy data.
- Create monitoring protocol for measurement and verification.
- Create monthly reports on performance.
- Create final report of findings and issue to OEIS and BGS.

Objective:

Work with BGS and other relevant state agencies to identify state facility for bio-mass application *(wood pellet or chips).*

Implementation:

- Identify one State facility that will switch to bio-mass for heating fuel.
- Create detailed scope of work and budget for bio-mass retrofit project.
- Obtain five years of fuel usage, electric usage, degree days and occupancy data.
- Create monitoring protocol for measurement and verification.
- Create monthly reports on performance.
- Create final report of findings and issue to OEIS and BGS.

Goal:
Assist public schools with converting from fossil fuels to bio-fuels.

Objective:

Research and select one school district for conversion from fuel oil to biomass or bio-oil.

Implementation:

- Select one school that is suitable for fuel oil to biomass or bio-oil conversion.
- Perform site audit to obtain site specific technical data and physical layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by BGS or other agencies.

Goal:
Encourage the development of ethanol-blend fueling stations.

Objective:

Facilitate a roundtable discussion with major transportation fuel companies.

Implementation:

- Research ethanol-blend fueling stations and demand for Maine.
- Create roundtable agenda and invite stakeholders.
- Facilitate roundtable discussions on ethanol-blend fueling stations in Maine.
- Document meeting notes and identified concrete action plan items.
- Create a report of findings for OEIS Director with recommendations for improvement.

Objective:

Explore the potential for development of E-85 ethanol-blended fuel pumping stations in Maine.

Implementation:

- Create a 10-year plan to encourage the development of ethanol pumping stations in Maine.
- Encourage the development of markets for the future production of cellulosic ethanol.

Goal: Increase the development and use of cogeneration and tri-generation in the State of Maine.

Objective: OEIS, in conjunction with the private sector, Executive Department, utilities and the Energy Resources Council, will undertake a project to examine opportunities for, eliminate barriers to, and create incentives for the installation of energy systems that conserve energy through the reuse of waste heat (cogeneration). (Resolve 183, 2008.)

Implementation:

- Identify all barriers and opportunities to private and government sector investment in tri-generation/cogeneration.
- Identify all current regulations related to the development of cogeneration/tri-generation.
- Work with private stakeholders and government regulators to identify barriers and develop solutions.
- Obtain input from key utility leaders in Maine on cogeneration/tri-generation.

Objective:

Identify tax and other financial incentives and potential policies to encourage the development of cogeneration/tri-generation systems.

Implementation:

- Identify all current incentives related to the development of cogeneration/tri-generation.
- Work with private stakeholders and government regulators to identify incentives, examine technical and policy issues to encourage cogeneration and tri-generation systems.

Objective:

Submit a report to the Utilities and Energy Committee by December 1, 2009 that includes findings and recommendations regarding energy conservation through the reuse of waste heat (cogeneration and tri-generation). (Resolve 183, 2008.)

Implementation:

- Establish a working group of private and government stakeholders to establish findings and legislative recommendations to encourage the use of waste heat (cogeneration and tri-generation) in both the government and the private sectors.

Objective:

Identify and initiate a cogeneration/tri-generation project at one hospital; one industrial site; and one multi-unit housing site.

Implementation:

- Investigate low cost project funding sources with existing public and private sources.
- Explore the creation of new funding through either a bond issue or other funding mechanism.
- Create site selection process and initiate dialogue with industrial, housing and hospital sectors.
- Create partnerships with private enterprise to create "Volunteer Project Teams" to perform preliminary work scope at no cost up front until project is funded. Teams will provide pre-engineering, feasibility studies and detailed scopes and cost estimates.
- Publicize each phase of the project implementation with media and Governor.
- U.S. EPA to provide certificate of emissions reduction; ribbon cutting, education and outreach.

Objective:

Educate State and private business leaders about the cogeneration/tri-generation energy model using the U.S. Environmental Protection Agency's Combined Heat and Power (CHP) "Partnership Educational Outreach Program".

Implementation:

- Work with the U.S. EPA to hold an educational and outreach forum on cogeneration/tri-generation.
- Develop an OEIS "Energy 101" fact sheet on cogeneration/tri-generation and post on website.

Goal:

Encourage the strategic location and development of industrial and district heating energy generation clusters.

Objective:

Create State-wide map of industrial facilities and potential district heating energy plants and "bubble" target areas for "Eco-Park" sites like BNAS Redevelopment, Madison's "Backyard Beauties", Auburn Industrial Park, City of Brewer, Bangor Air-port Complex, Millinocket, Saco-Island, and others.

Implementation:

- Create state-wide map of industrial and potential district heating power plant sites.
- Identify electrical and thermal energy used by each industrial site.

- Identify merchant plant capacity and fuel types.
- Identify potential clusters for existing and future growth areas.
- Create list of areas where a district heating or "Eco-Park" would work for private or public tri-generation facility using biomass or another fuel source.
- Create priority list for three sites to pursue for development of a district heating or Eco-Park.

Objective:

Create project team for the pre-development of one district heating or Eco-Park site.

Implementation:

- Perform pre-engineering feasibility study for a district heating or Eco-Park location selected.
- Create "Volunteer Project Team" to perform preliminary work scope at no cost up front until project is funded. Team will provide pre-engineering, feasibility studies and detailed scopes and cost estimates.
- Publicize each phase of the project implementation with all media and Governor.

Goal:

Assist the University of Maine and other colleges with the use of bio-mass/bio-fuel cogeneration and tri-generation energy systems.

Objective:

Create an educational forum for Universities and Colleges regarding bio-fuel applications.

Implementation:

- Utilize U.S. EPA's "CHP Training Programs" for forum on tri-generation energy model.

Objective:

Select one site for bio-mass tri-generation application.

Implementation:

- Research one college that is suitable for bio-mass tri-generation.
- Perform site audit to obtain site specific technical data and physical layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding college or other agencies.

Objective:

Work with one college in Maine to switch from fuel oil to biomass or bio-oil usage.

Implementation:

- Research one college that is suitable for switching from fuel oil to biomass or bio-oil conversion.
- Perform site audit to obtain site specific technical data and physical layouts.
- Perform precursory design to create project scope, budget and potential savings.
- Create project presentation for approval and funding by college or other agencies.

Goal:

Increase the generation of renewable power into the State of Maine's electricity portfolio.

Objective: Increase the existing Renewable Portfolio Standard (RPS) requirement in Maine above the existing requirement of 10% of new renewable energy by 2017.

Implementation:

- Develop a solar power energy goal and achieve that goal by 2020 as part of the State's RPS.
- Develop a biofuels energy goal and achieve that goal by 2020 as part of the State's 2020 RPS.
- Increase support for "community-owned" energy and include a 1% carve out in the RPS.
- Meet the State's wind power goals by 2020.
- Increase the RPS requirements starting in 2017 to 25% by 2030.

III. IMPROVING TRANSPORTATION AND FUEL EFFICIENCIES

Goal:

Support and enhance state and private sector efforts for education and awareness of alternative transportation options and promotion of a low-carbon fuel standard and fuel efficient vehicles.

Objective:

Work with MDOT, GOMAINE, the private and public transportation sectors, and the auto and truck industries to continue outreach campaigns on alternative transportation options and fuel efficient vehicles.

Implementation:

- Continue "Share Your Ride" statewide PSA campaign to promote ridesharing and carpooling.
- Continue statewide radio campaign for the GO Maine program to promote the state's vanpool program.

- Work with private employers, transit providers and the media to promote alternative transportation options.
- Continue to provide fuel-wise and fuel-efficient vehicle tips to the public.
- Provide information on park-and-ride lots to the public.
- Increase awareness of transit commuter benefits to employees and employers, and thus transit use, through the "Commuter Choice Pre-Tax" program.
- Work with transit providers and MDOT to continue "Free Fare Fridays".
- Utilize Variable Message Signs (VMS) on highways to reach tens of thousands of commuters and other travelers to generate public awareness of alternative transportation tips and options.

Objective:

In collaboration with DEP, monitor and coordinate state policy and programs to encourage adoption of a low-carbon fuel standard and reduction of vehicle miles traveled in the State.

Implementation:

- Participate in the State's Climate Change Action Plan's "VMT group" and report to the Legislature on annual progress made and make recommendations on potential future policies.

Goal: Support state programs that encourage the use of carpools, vanpools, car-sharing and telecommuting.

Objective:

Work with MDOT, GO MAINE, other state agencies and the private sector to expand existing commute options.

Implementation:

- Continue to increase the GO Maine commuter database and expand the GO Maine web-based/real-time "Trip Planner".
- Continue to add GO Maine commuter vans beyond the current 12 for ride-sharing.
- Actively recruit car-sharing companies to locate and provide services in Maine.
- Expand existing state telecommuting policy beyond the existing pilot program.
- Encourage state and private employees to take advantage of telecommuting programs.
- Investigate the use of private sector vans and busses for additional vanpool and transit capacity.
- Consider implementing a statewide electronic fare card for use on all transit.
- Promote the use of preferential parking to reward carpools, vanpools and car-sharing participants.

- Investigate requiring Transportation Demand Management Associations in large population centers to encourage alternative transportation programs for large employers.

Goal: Support state transportation investments and encourage private investment for enhanced passenger and freight transportation systems.

Objective:

Work with MDOT, the Northeast Passenger Rail Authority, other railroads and the private sector to prioritize transportation investments in passenger transit and rail infrastructure.

Implementation:

- Make transit and rail a higher priority in all State transportation planning and funding requests.
- Increase transit capacity (more buses, more frequency) and upgrade existing fleet.
- Implement a "customized transit" approach in rural areas ensuring flexibility that incorporates an internet-based system to connect riders with transit providers.
- Work with the Maine Congressional Delegation and the Obama Administration to actively pursue federal funding for transit, rail and other transportation-related program funding.
- Investigate potential bonding to fund rail and transit expansion projects.
- Amend state Tax Increment Financing (TIF) rules to include the use of funds for transit operating and development of transit-oriented developments.
- Streamline the State transit procurement process to ensure timely delivery of new busses.
- Investigate building and manufacturing transit buses in Maine.
- Continue to work toward expanding the Downeaster train to Freeport, Brunswick and beyond.
- Augment the passenger rail network on the Downeaster route with additional stops at strategic locations along the way, using self-propelled cars.
- Continue working with the Northern New England Passenger Rail Authority to increase routes and capacity on the Downeaster.
- Pursue rebuilding the Portland-Westbrook section of the Mountain Division railroad to be developed into a commuter rail and freight rail corridor.

Objective:

Work with MDOT and freight railroads to prioritize investments in freight transportation.

Implementation:

- Continue the Rail Access Program that provides immediate relief for businesses in need of connections to railroads.

- Continue the Local Freight Rail Assistance Program that provides loans to owners of property adjacent to rail lines and railroads to improve their access to rail service.
- Implement the Truck Efficiency Tax Incentives Program that provides incentives for small fleet motor carrier operations to save energy by improving fuel efficiency, reducing emissions, reducing idling, speed controls, advanced tire technology, advanced lubricants, and empty weight reductions.
- Continue to advocate for a 100,000 lb. federal weight limit for Maine Interstates
  in order to provide relief to Maine shippers and truckers at no cost to increase payload productivity up to 44% and reduce fuel consumption per loaded ton.
- Continue funding rail/truck intermodal facilities that reduce highway congestion and give shippers another cost-effective option to move their products.
- Work to reopen the Lewiston Lower Road rail line to the Lisbon Industrial Park.
- Explore implementing new technology for freight trucks' on-board systems for anti-idling through public/private partnerships including but not limited to Maine Motor Transport driver training programs.

Objective:

Work with MDOT, local transit providers and municipalities to prioritize transportation investments in bike and pedestrian infrastructure.

Implementation:

- Allow bikes on transit buses and trains.
- Stretch federal funding for bike amenities – 50% match for private sector, 20 to 30% match for public sector.
- Fast-track pedestrian improvements that allow better access to transit such as signs and cross-walk striping.
- Require bike racks or bike parking amenities for all new development permits.
- Aggressively pursue funding for additional bike lanes in urban areas.
- Fast-track Safe Routes to School funding to reduce the huge amount of driving and cost for getting kids to school by buses and private cars. Improve the conditions for walking and cycling around urban and suburban schools, including sidewalks and cycling facilities, organize walking school buses and other human powered options.

Objective:

Work with MDOT, other relevant state agencies and the private sector to increase the use of alternative transportation fuels, including a low-carbon fuel.

Implementation:

- Develop a strategic plan to expand alternative fuel refueling infrastructure throughout the State.
- Continue working with the 10 "RGGI" states to implement a low-carbon fuel standard.
- Work with local utilities and Compressed Natural Gas (CNG) refueling station providers to identify and contact potential users of CNG refueling infrastructure with the goal of developing sufficient demand to support a second publicly accessible fast fill CNG refueling station in Portland.
- Work with State agencies to place additional alternative fuel vehicles in the state fleet.
- Work with school districts and other stakeholders to encourage use of alternative fuel vehicles and alternative fuels as appropriate in school bus fleets.
- Develop greater fuel diversity for public transit, public works, state and private fleets to avoid dependency on one fuel when prices increase.
- Explore the viability of converting sewage treatment gases (biogas) into methane for pipeline use and/or in stationary and vehicle engines. This has the added advantage of reducing harmful green house gases emitted by sewage treatment facilities.
- Work with propane providers and interested fleets, especially in rural areas where propane is the alternative fuel of choice, to build propane fueling infrastructure and purchase the vehicles to support it.
- Expand incentive program to communities to purchase clean fuel vehicles. (MDOT has increased the state match of federally funded projects to 15%, reducing the local share to 5%.)
- Reinstate State tax incentives for the purchase of biodiesel fuel and the purchase of hybrid cars.

Goal:

Encourage greater coordination of land use and transportation policy to reduce vehicle miles traveled and decrease greenhouse gas emissions.

Objective:

Work with other state agencies and non-profit organizations to identify and implement key land use planning policies that promote "smart growth" through the development of mixed-use, compact development.

Implementation:

- Locate new housing developments near transit and existing services.
- Work with and provide incentives to developers that promote "smart growth".
- Support "smart growth" policies that discourage sprawl development.
- Support "location efficient" mortgages that provide incentives for living near jobs and services.

- Support “asset based plans” for the six regional economic districts based on identified critical quality of place assets in each district that reduce sprawl and promote local downtowns.
- Develop a model ordinance that encourages mixed-use development and provides alternatives to driving.
- Require large commercial and development projects to locate in “designated growth areas” or close to existing infrastructure.
- Require large residential subdivisions to be located in “designated growth areas”, close to existing infrastructure or be a conservation subdivision.
- Require schools to be located in “designated growth areas” or close to existing infrastructure.

Objective:

Work with other state agencies and non-profit organizations to identify and implement key transportation planning policies that promote “smart growth” through the use of transit-oriented development.

Implementation:

- Encourage walkable access in existing transit corridors to be included in State comprehensive plans.
- Do a planning assessment of existing and future transit corridors for their Transit Oriented Development potential.
- Target transportation investments in growth areas to spur efficient patterns of development, encourage infill and redevelopment.
- Develop a model “parking reduction “ordinance that allows for fewer parking spaces at new developments located near transit.
- Develop a model “trip-reduction” ordinance to provide incentives to locating new development on transit routes and/or in walkable downtown districts.
- Require smart growth policies be in place before large transportation investments are made.
- Revise and enforce school siting policies to recognize the qualitative benefits of rehabilitating and modernizing existing neighborhood schools and avoiding greenfield school construction that often increases transportation.
- Allow Local or Regional Option Taxes that allow municipalities and/or regions to enact sales tax add-ons to fund local transportation projects and pay operating costs of transit.

Objective:

Research forest products’ industry mileage traveled between resource and process.

Implementation:

- Survey major stakeholders to determine transportation profiles.
- Compile all data into spreadsheet and analyze.
- Create a report of findings for OEIS Director with recommendations for improvement.

Goal:

Support public-private partnerships to develop "explorer" transit systems for tourist destinations.

Objective:

Coordinate and facilitate a roundtable discussion with stakeholders for explorer transit.

Implementation:

- Create agenda for roundtable and invite stakeholders to attend.
- Use Acadia National Park as the "explorer" model for other tourist-based destinations in the state.
- Facilitate roundtable and document findings and concrete action items.
- Issue report to on roundtable event.

IV. UPGRADING ELECTRICITY AND NATURAL GAS SERVICES, TRANSMISSION SYSTEMS AND INFRASTRUCTURES

Goal:

Support the development of electrical transmission projects in Maine for increased reliability and to accommodate new Maine-based wind power from both on-shore and off-shore projects.

Objective:

Work with Maine utilities and interested parties to obtain "socialized" and other collaborative means of funding from the ISO-NE for proposed electrical transmission projects.

Implementation:

- Continue working to support policies at the ISO-NE for "socialized" transmission funding in New England.
- Facilitate discussions with Maine utilities and interested parties to determine action for project support among other New England states.
- Continue to encourage all parties to explore mutually beneficial, alternative funding mechanisms for transmission funding in New England.

Objective:

Continue working with the ISO-NE, other New England states, the Northeast International Committee on Energy (NICE) and the New England Governors' Conference (NEGC) to determine an appropriate agreement on "socialized" and other collaborative means of funding transmission costs.

Implementation:

- Continue to represent Maine's interests in various ISO-NE and NEGC meetings and forums.
- Continue to pursue an open dialogue with the ISO-NE and NEGC key staff.

Objective:

Support and encourage Federal funding of an enhanced "smart grid" transmission system in Maine and New England.

Implementation:

- Work with the Maine Congressional delegation to obtain Federal funding for transmission projects in Maine.
- Work with various state-related organizations, the NICE Committee, the NEGC, the Eastern Canadian Provinces, DOE, U.S. EPA, the National Governors Association and the Obama Administration to obtain Federal funding for transmission projects in Maine.

Goal:

Support the development of electrical transmission projects in Maine to accommodate economically and environmentally sustainable renewable energy from Northern Maine and Canada.

Objective:

Continue working with the NEGC and Eastern Canadian Premiers on an agreement on the transmission of clean, renewable power from Canada into New England.

Implementation:

- Continue to lead Governor Baldacci's effort with the New England states to craft a proposed energy policy initiative to the Eastern Canadian Premiers on clean, renewable bilateral power transmission.
- Continue to work with the MPUC, the Maine Public Advocate and New Brunswick to develop an MOU on clean, renewable, bilateral power transmission.
- Continue to Chair the NEGC Power Planning Committee and co-chair the NICE to investigate, discuss and recommend potential strategies for clean, renewable, bilateral power transmission between New England and the Eastern Canadian Provinces.

Goal:

Promote natural gas as a "transitional fuel" by expanding the natural gas infrastructure to all sectors in Maine.

Objective:

Convene a year-long, natural gas "dialogue" with all major natural gas players in the state to define the critical challenges regarding the development of traditional natural gas and Liquified Natural Gas (LNG) in Maine and to identify opportunities for the development of traditional natural gas and LNG projects where economically, socially and environmentally feasible.

Implementation:

- Establish a host committee of key natural gas industry leaders.
- Organize a "kick-off" reception for key natural gas industry, regulators and other stakeholders to be addressed by Governor.
- Conduct a series of 4-5 policy dialogue meetings over the next year to discuss important issues facing the natural gas industry, potential expansion and potential barriers and solutions.
- Continue to explore the feasibility of the development of a LNG facility in Maine.

Objective:

Facilitate opportunities for private industry and residential customers to connect with natural gas companies in Maine to explore potential natural gas expansion projects.

Implementation:

- Continue to facilitate relationships and work with natural gas utilities in Maine to develop specific expansion projects to all sectors.
- Recruit large potential customers to anchor gas network expansions.

V. STATE OF MAINE LEADING BY EXAMPLE

Goal:

Continue "lead by example" initiatives in Maine by implementing progressive energy policies applicable to State, County and local governments.

Objective:

Continue the "Clean Government Initiative" and expand upon current energy-saving policies.

Implementation:

- Continue purchasing 100% of "green electricity" at State facilities.
- Continue and increase the purchase of biofuels for heating at state facilities and expand to transportation fleet.
- Continue to incorporate LEED standards for all new and renovated state buildings.
- Continue to expand the hybrid car fleet from its current 90 hybrid cars.

- Continue to require state-purchased vehicles to meet 30 miles per gallon fuel economy.
- Continue to expand the purchase of environmentally friendly commodities and services.
- Continue to expand the purchase of paper and paper products with 30% post-consumer content.
- Pursue the purchase of "wholesale power" by all State facilities.

Goal:
Continue to plan for Maine's long term energy independence and security by using a 50-year planning horizon.

Objective:
Monitor progress of the Plan and quantify energy reductions, benefits, and expenditures.

Implementation:

- Report annually to the Governor and the Utilities and Energy Committee on the progress of meeting the goals, objectives and implementation measures included in this Plan and revise as necessary.

Objective:
Advocate for the goals included in this Plan at the State and Federal levels.

Implementation:

- Work with the Administration and the Utilities and Energy Committee to determine top priorities, implementation measures and how to achieve them.
- Work with the Maine Congressional delegation to establish a baseline knowledge of the state's energy goals and objectives and determine how best to enlist Federal support and funding.

VI. Emergency Preparedness and Response

Goal:
Continue to plan for an Energy Emergency.

Objective:
Update the 2007 State of Maine Energy Emergency Management Plan.

Implementation:

- Clarify the process and procedures of the Pre-Emergency Energy Management Plan.
- Continue to collect critical information regarding the energy sources, sinks and transmission/transportation infrastructure.

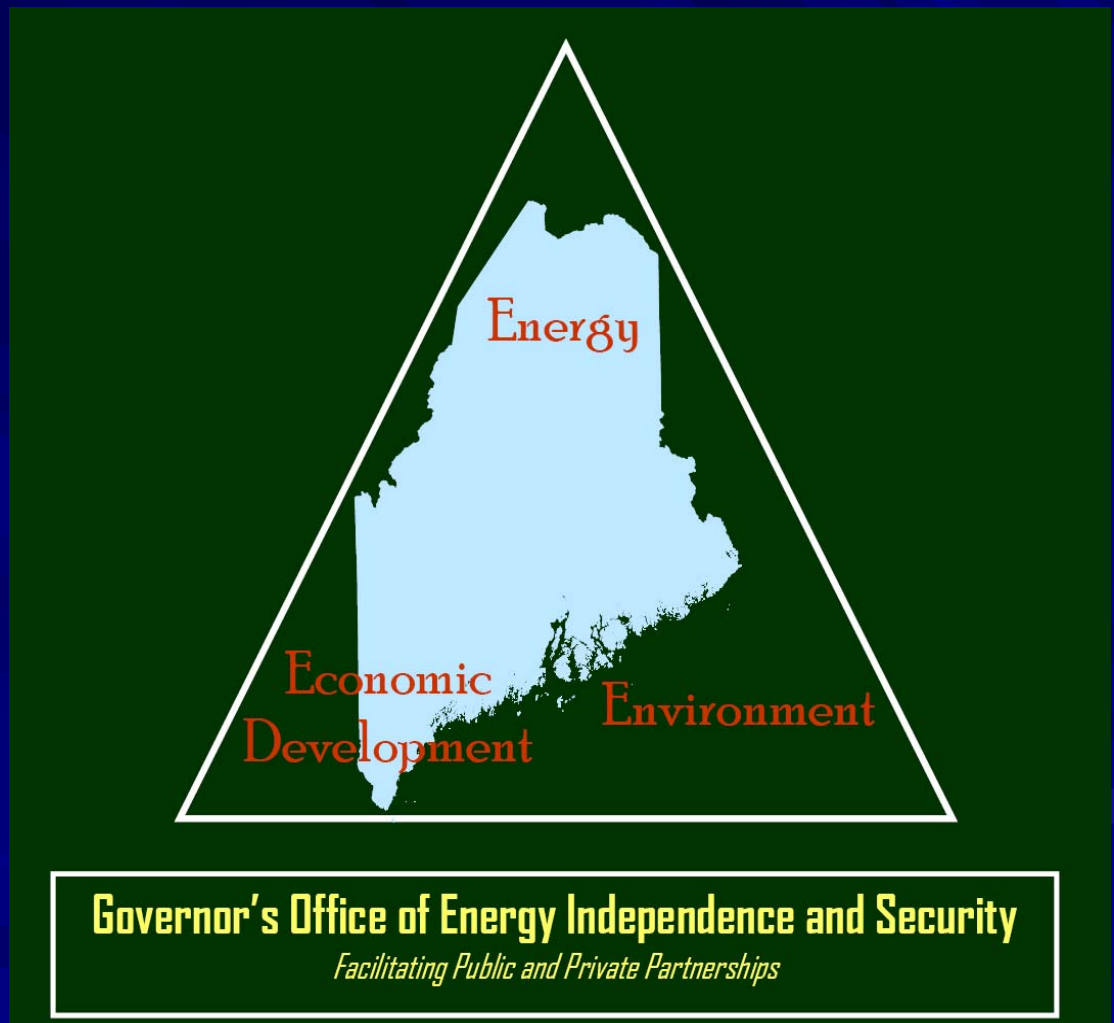
- Identify additional energy hazards
- Convene meetings with other state agencies, the Energy Resource Council, private sector stakeholders, the utilities to assist in identifying issues and areas of critical concern.
- Continue to coordinate the collection, analysis and dissemination of critical energy information to the Governor, the legislature, the cabinet and the public.
- Continue to work and communicate with all relevant international, federal, regional, state, county and local officials to maintain the effectiveness of the State's Energy Emergency Management Plan.
- Continue to work with ISO-New England, the natural gas pipelines, the natural gas producers and the natural gas electricity generators to clearly identify the OP-4 Emergency Procedures, especially in the areas of natural gas electricity generation.

MAINE'S COMPREHENSIVE ENERGY PLAN
2008-2009

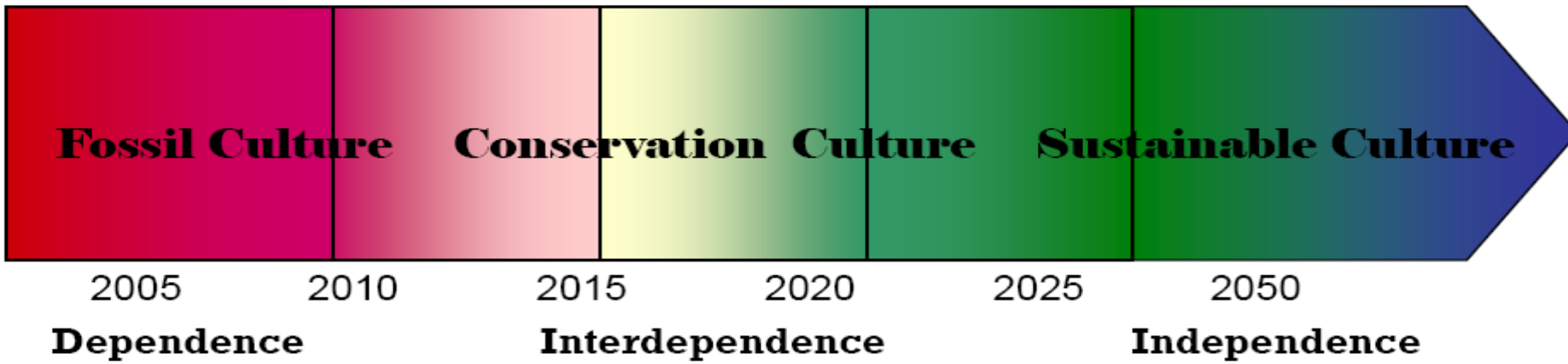
MAINE ENERGY PROFILE

Nothing rattles in the universe
everything is connected.
-Albert Einstein

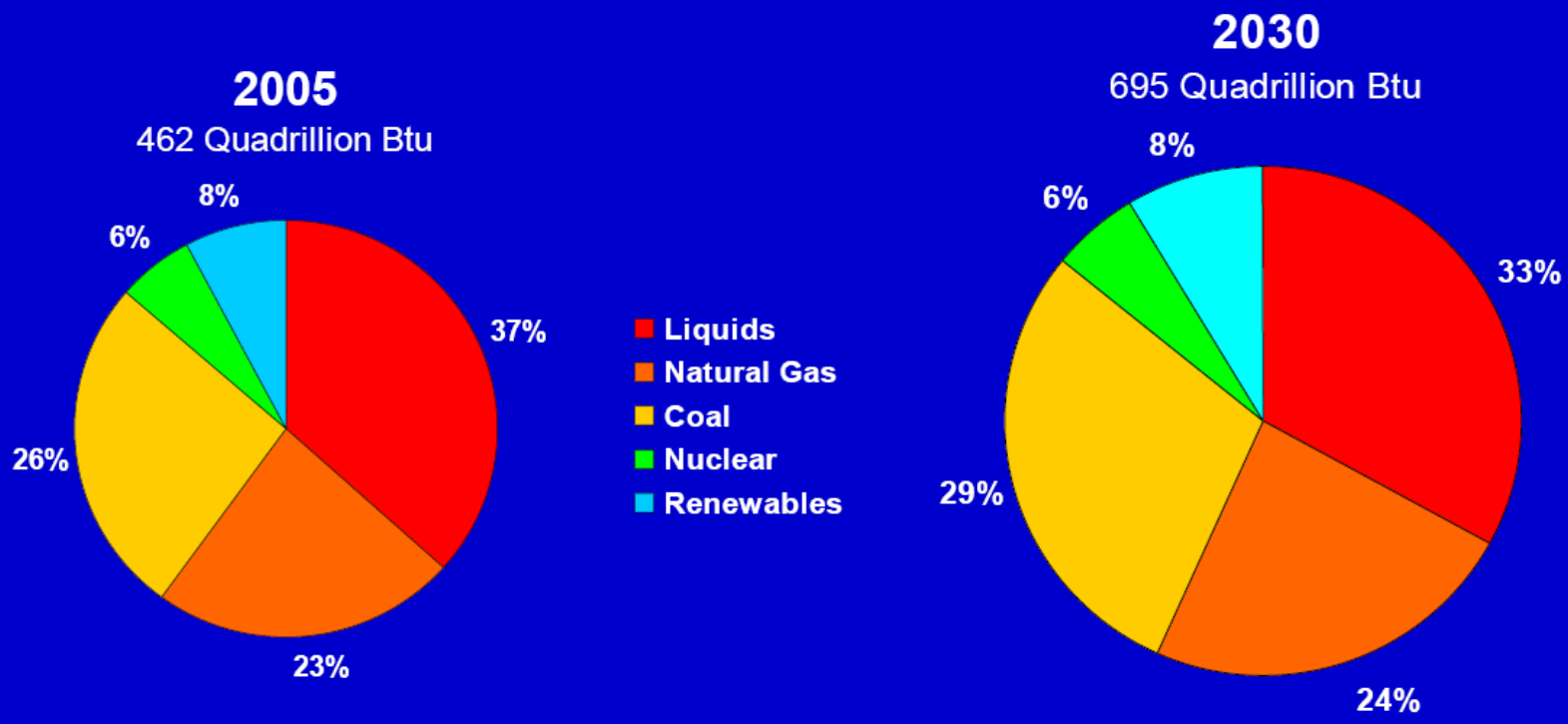
Overview


Energy
Economic Development
Environment
Governor's Office of Energy Independence and Security
Facilitating Public and Private Partnerships

Energy Independence for Maine



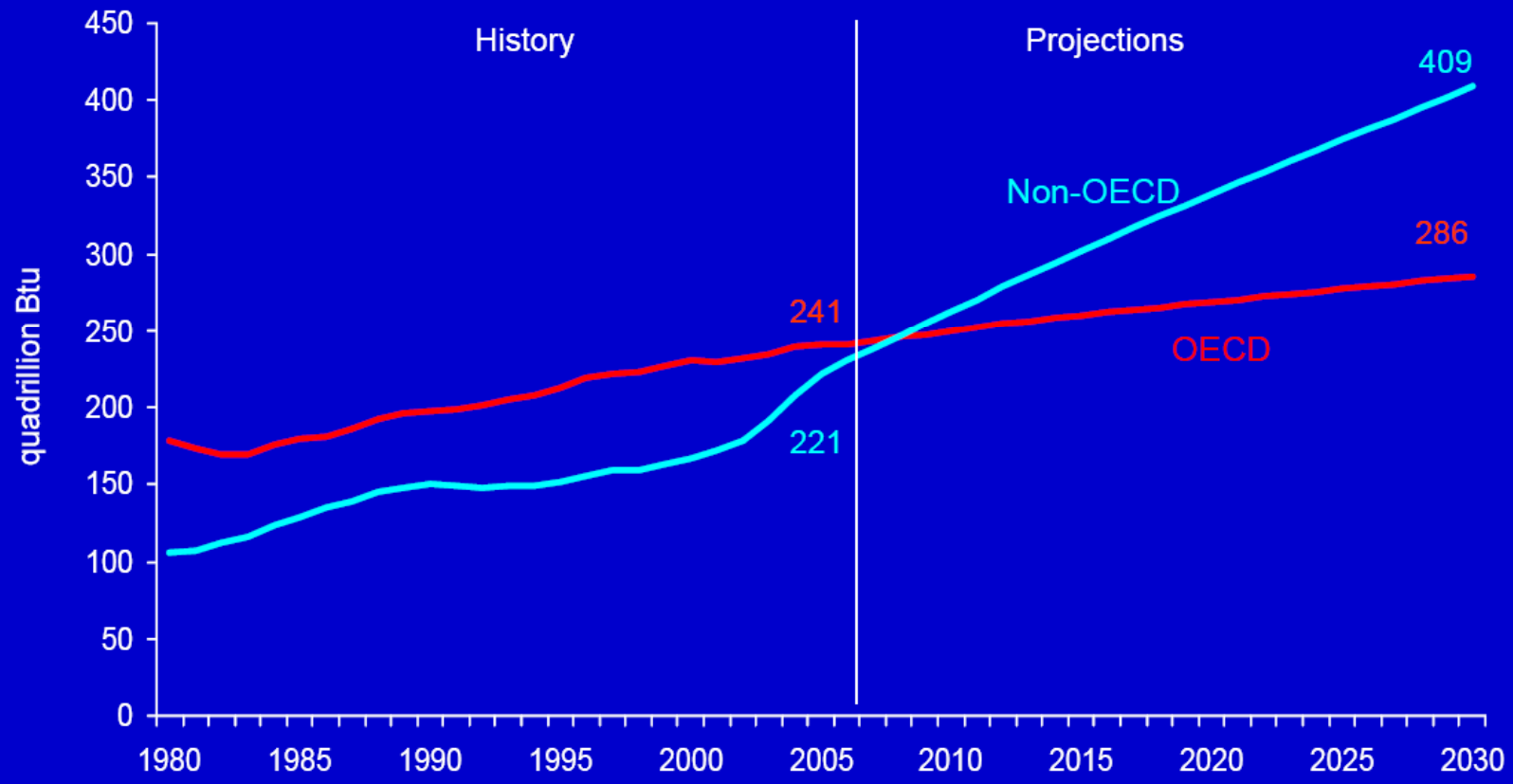
Global Energy Consumption



Source: EIA/IEO 2008

Slide: Verrastro

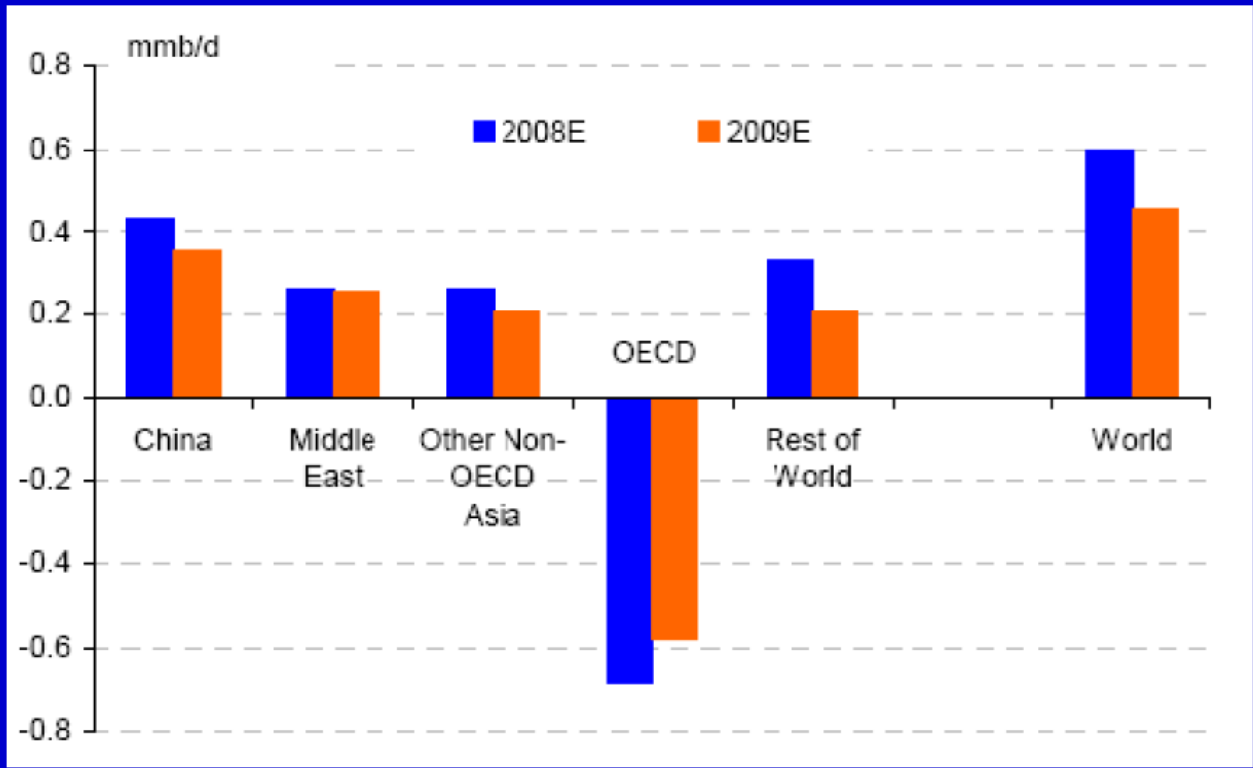
World Marketed Energy Use: OECD and Non-OECD



Source: EIA/IEO 2008

Slide: Verrastro

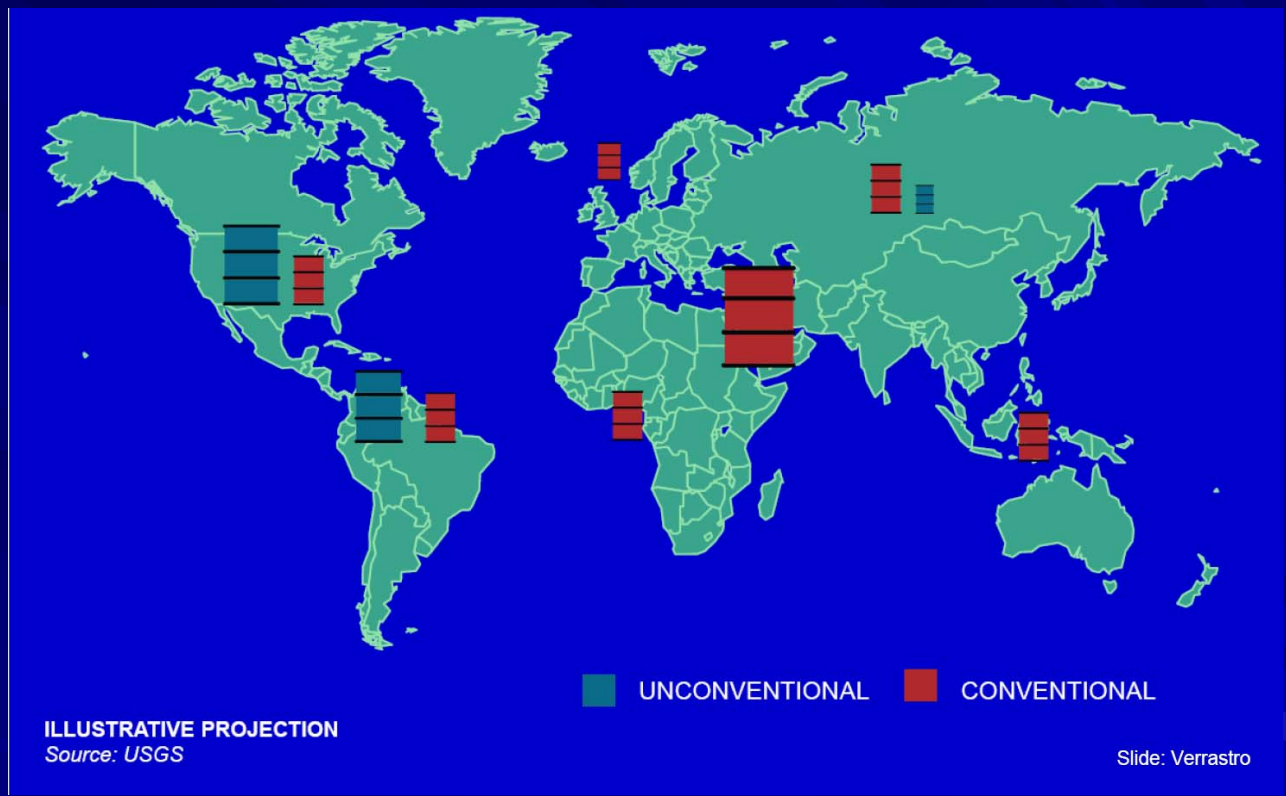
Oil Demand Growth by Region



Source: IEA, DB Global Research Graphic

Slide: Verrastro

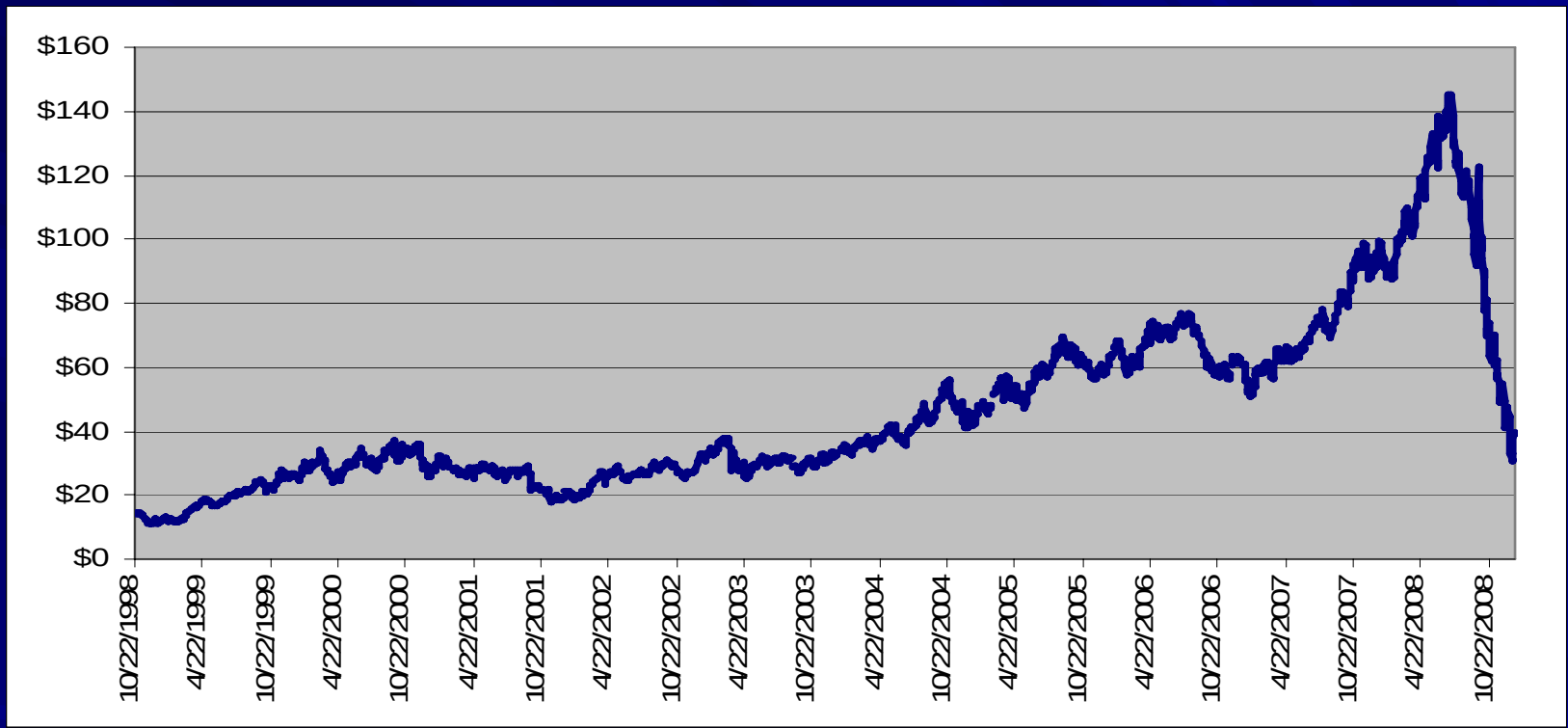
Global Oil Reserves



Slide: Verrastro

Crude Oil Prices

Ten Year WTI Spot Price



Source: EIA

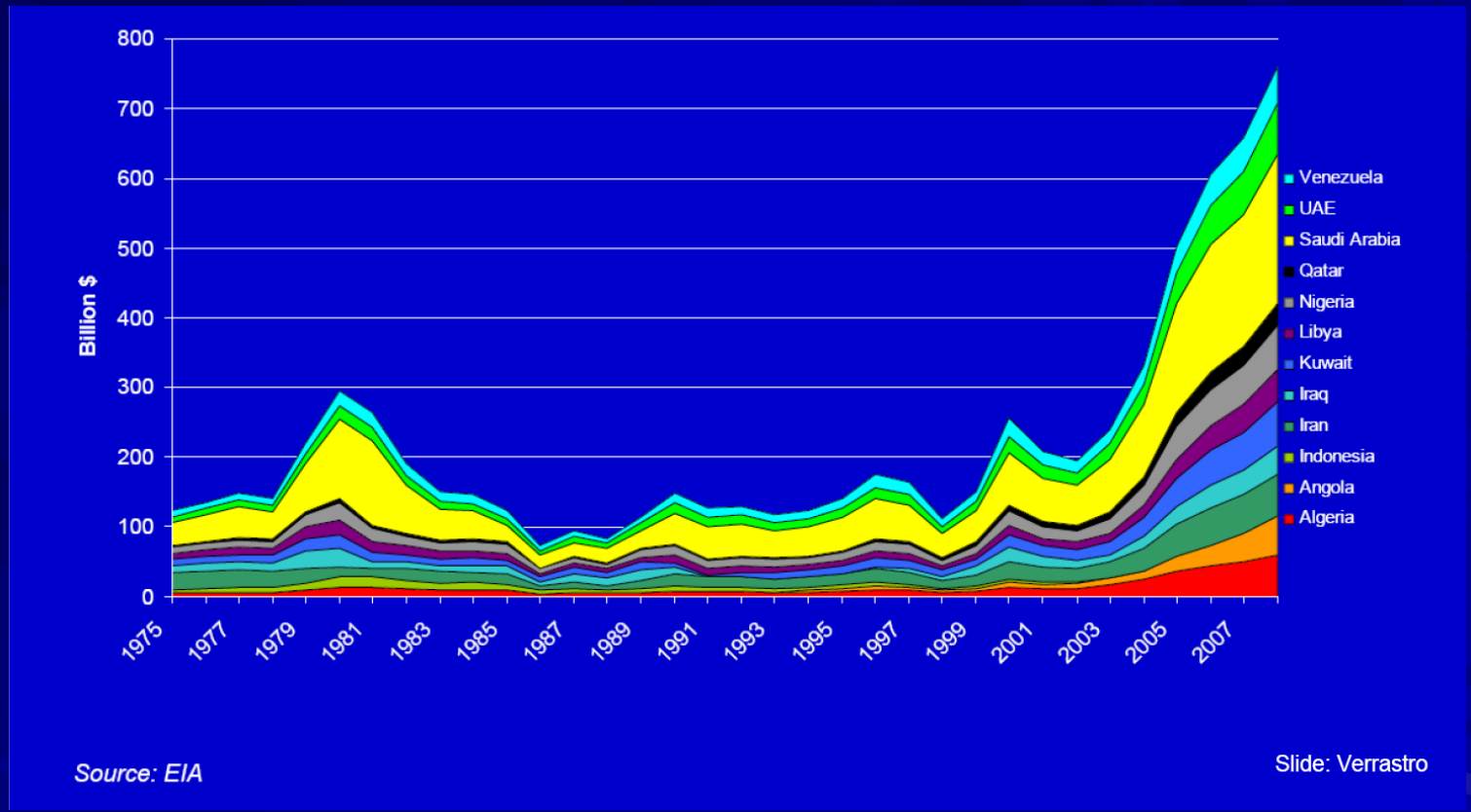
Crude Oil Prices

Two Years WTI Spot Price

Source: EIA

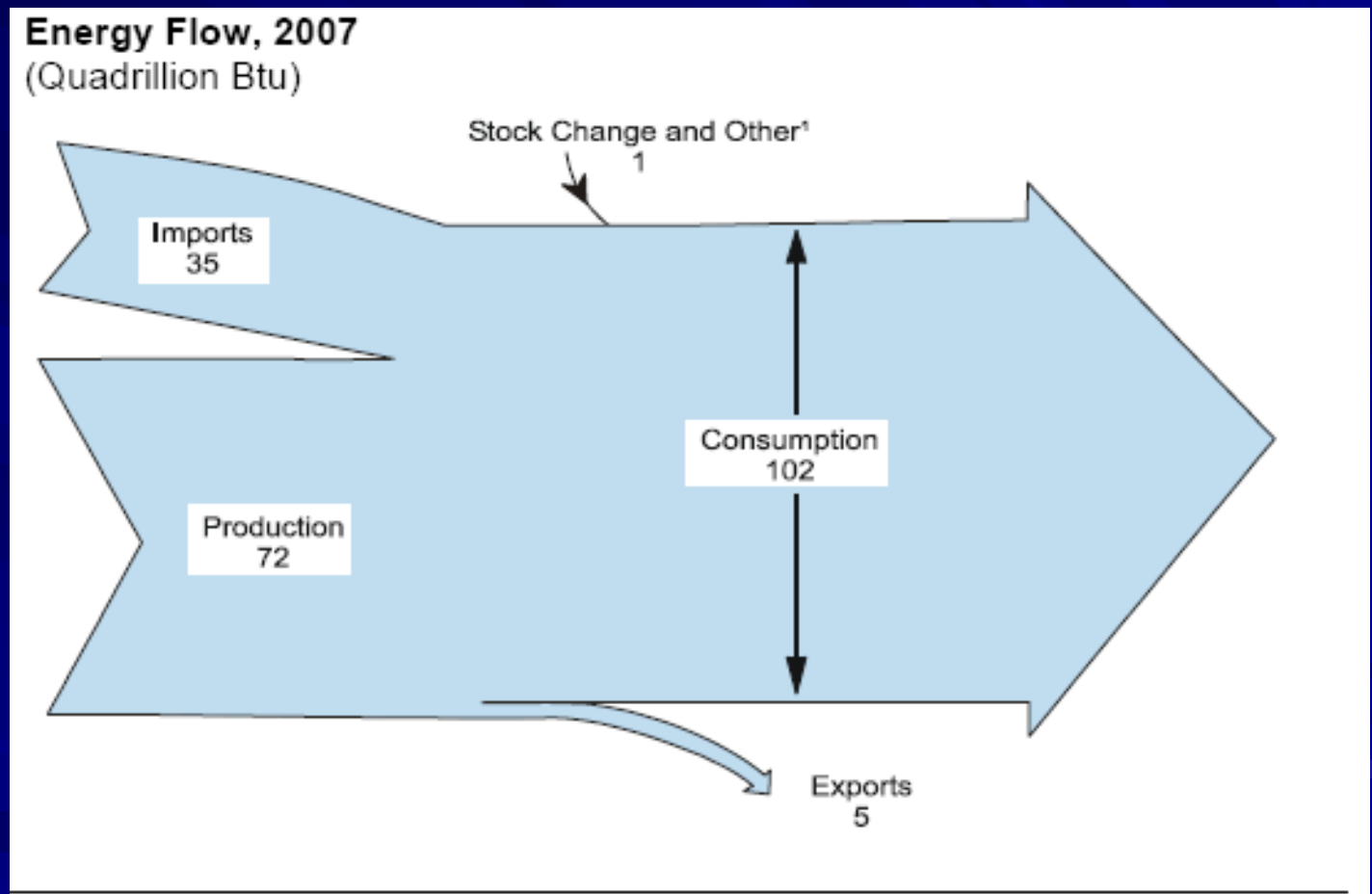
OPEC Oil Revenue

Estimated $750 Billion in 2008



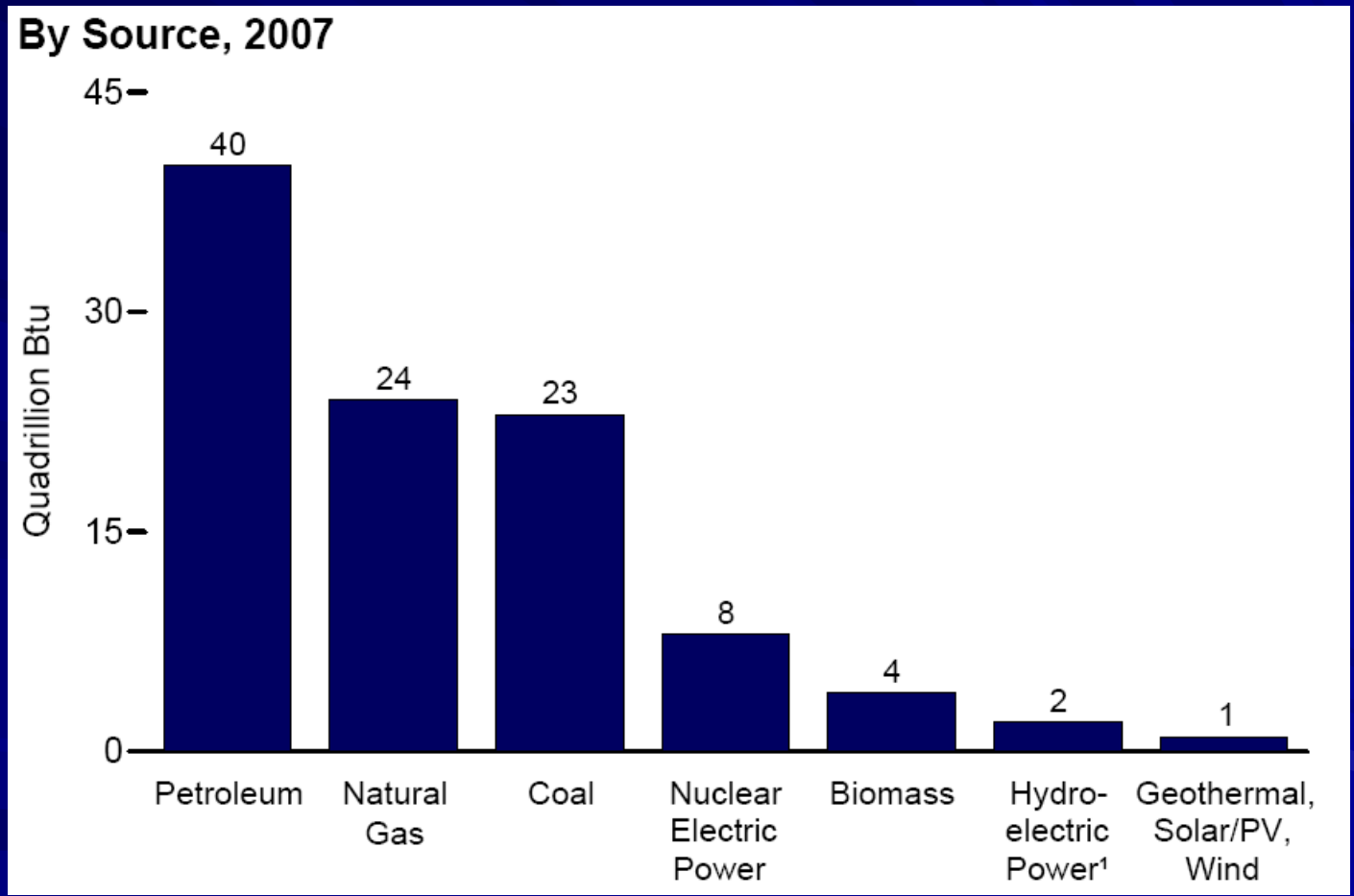
National Energy Context

National Energy Flow



Source: EIA

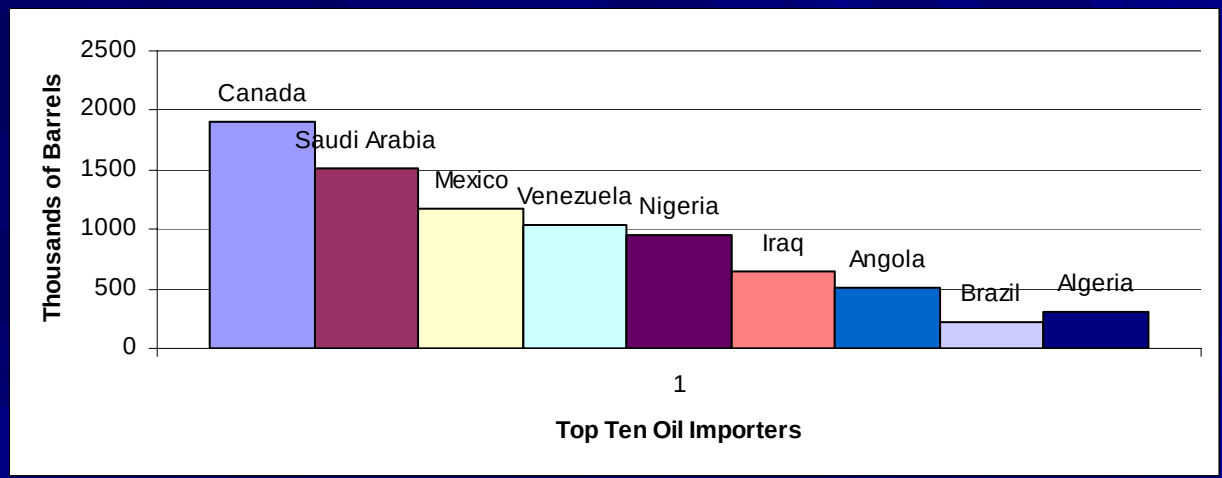
National Primary Energy Consumption



Source: EIA

Top Ten Oil Importers to the U.S.

	2008
Canada	1912
Saudi Arabia	1520
Mexico	1180
Venezuela	1038
Nigeria	944
Iraq	652
Angola	504
Brazil	228
Algeria	312
Thousands of Barrels per Day	

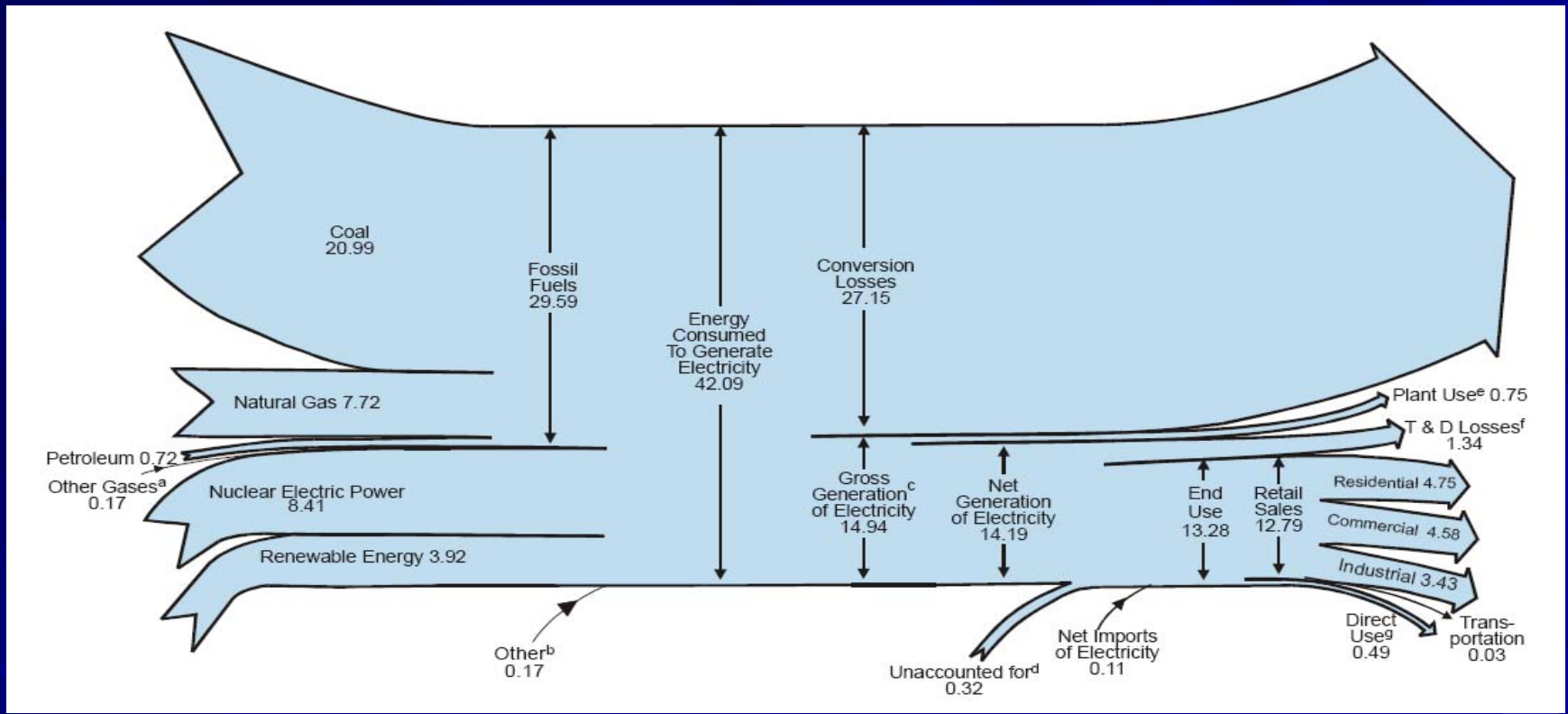


- Total US Production:
  - 5 Millions of Barrels per day
- Total US Net Oil Imports:
  - 13 Millions of Barrels per day

Source: EIA

National Electricity Flow

By Supply and Sector

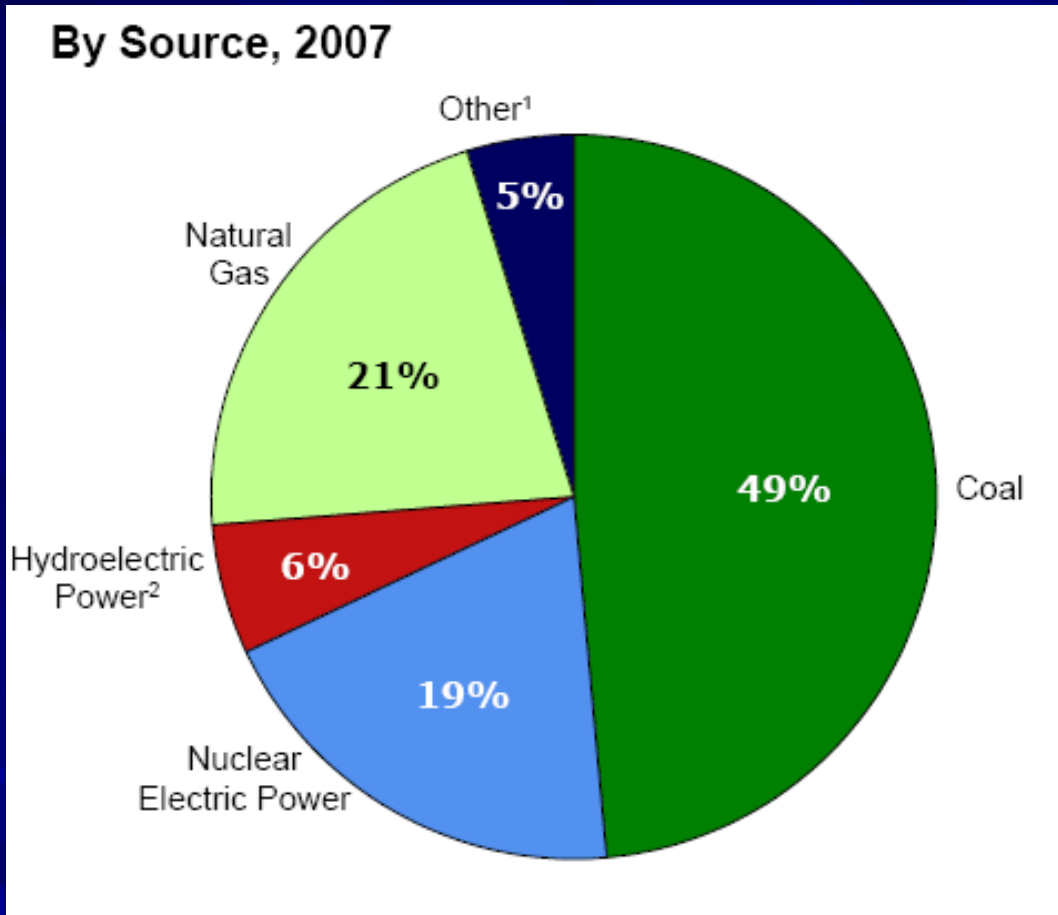


In Trillion BTU

Source: EIA

National Electrical Generation

By fuel



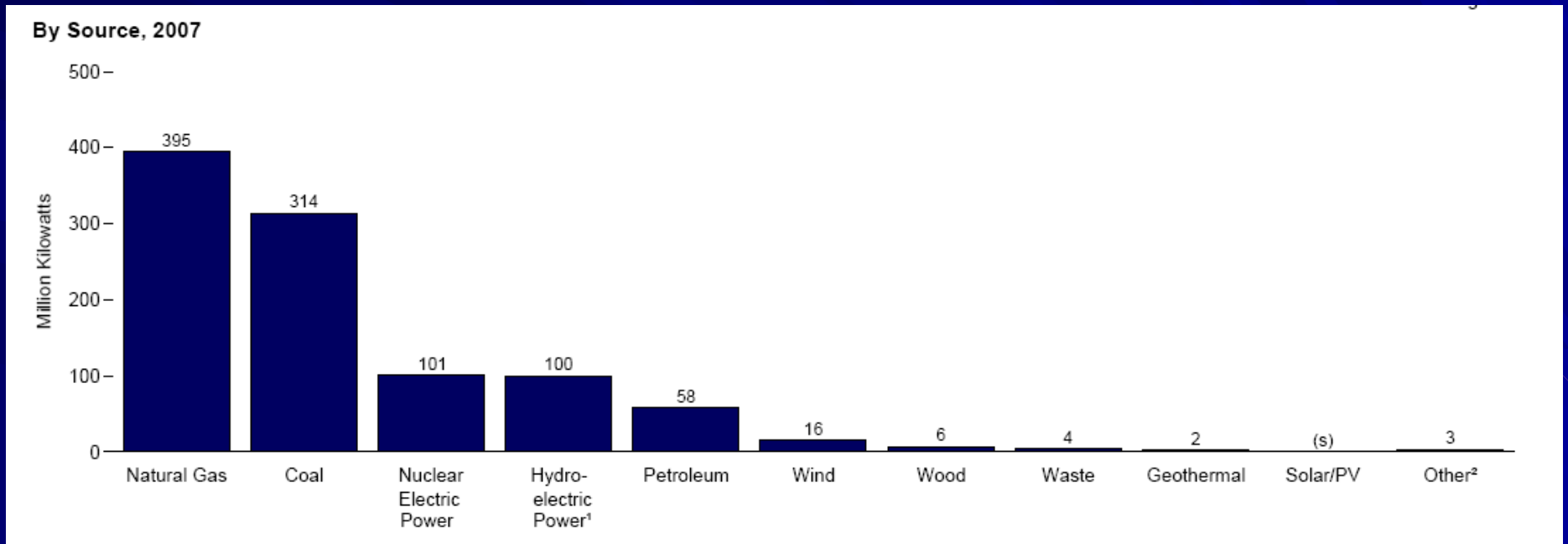
Source: EIA

1 Petroleum, wood, wind, waste, other gases, geothermal, solar, batteries, chemicals, hydrogen, pitch, puchased steam, sulfur, miscellaneous technologies, and non-renewable waste (municipal solid waste from non-biogenic sources, and tire-derived fuels).

2 Conventional hydroelectric power and pumped storage.

National Peak Electrical Generation Capacity

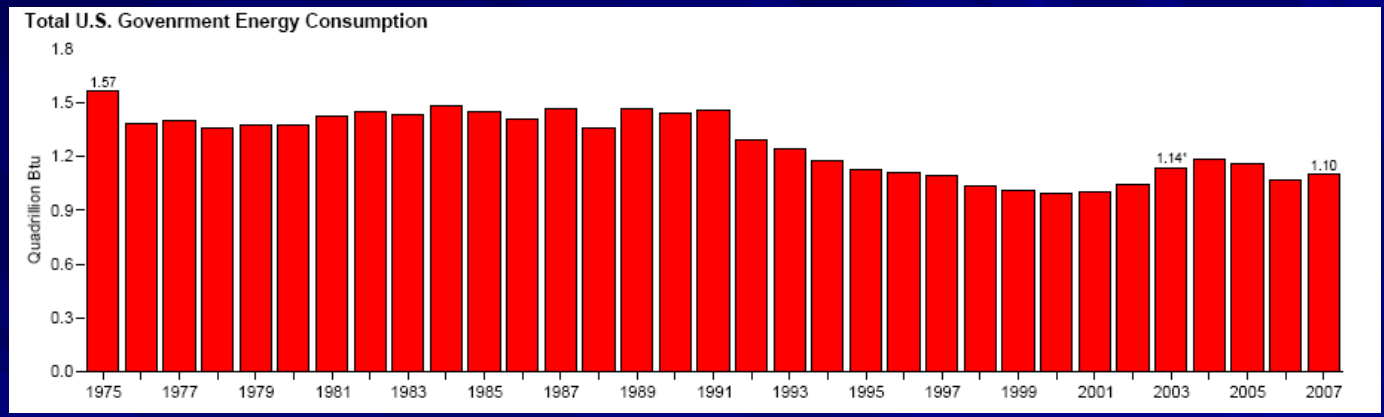
2007

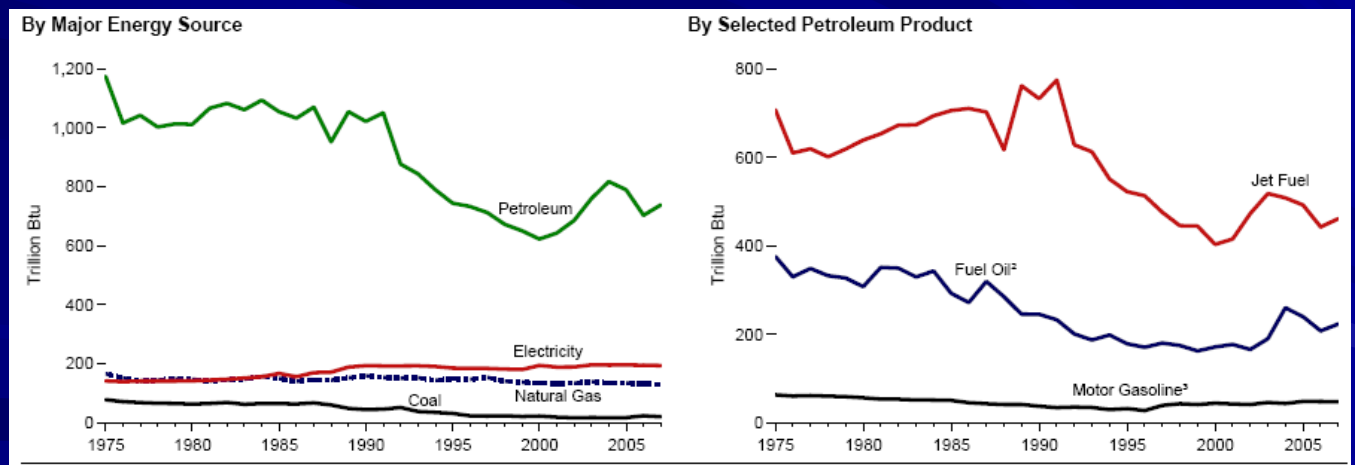


Source: EIA

1.Conventional and pumped storage.
2. Blast furnace gas, propane gas, other manufactured and waste gases derived from fossil fuels, batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.

Federal Government Energy Use



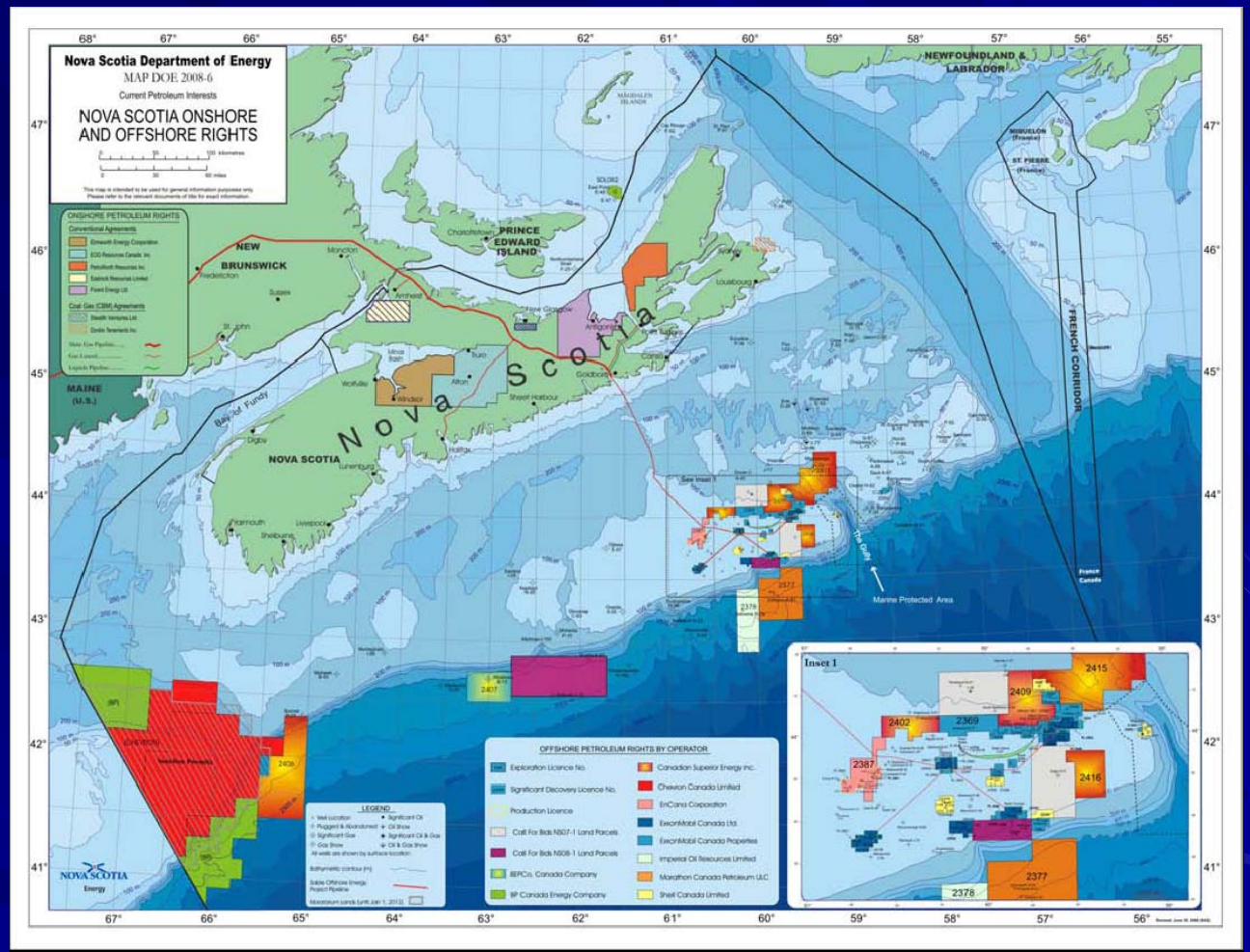


Source: EIA

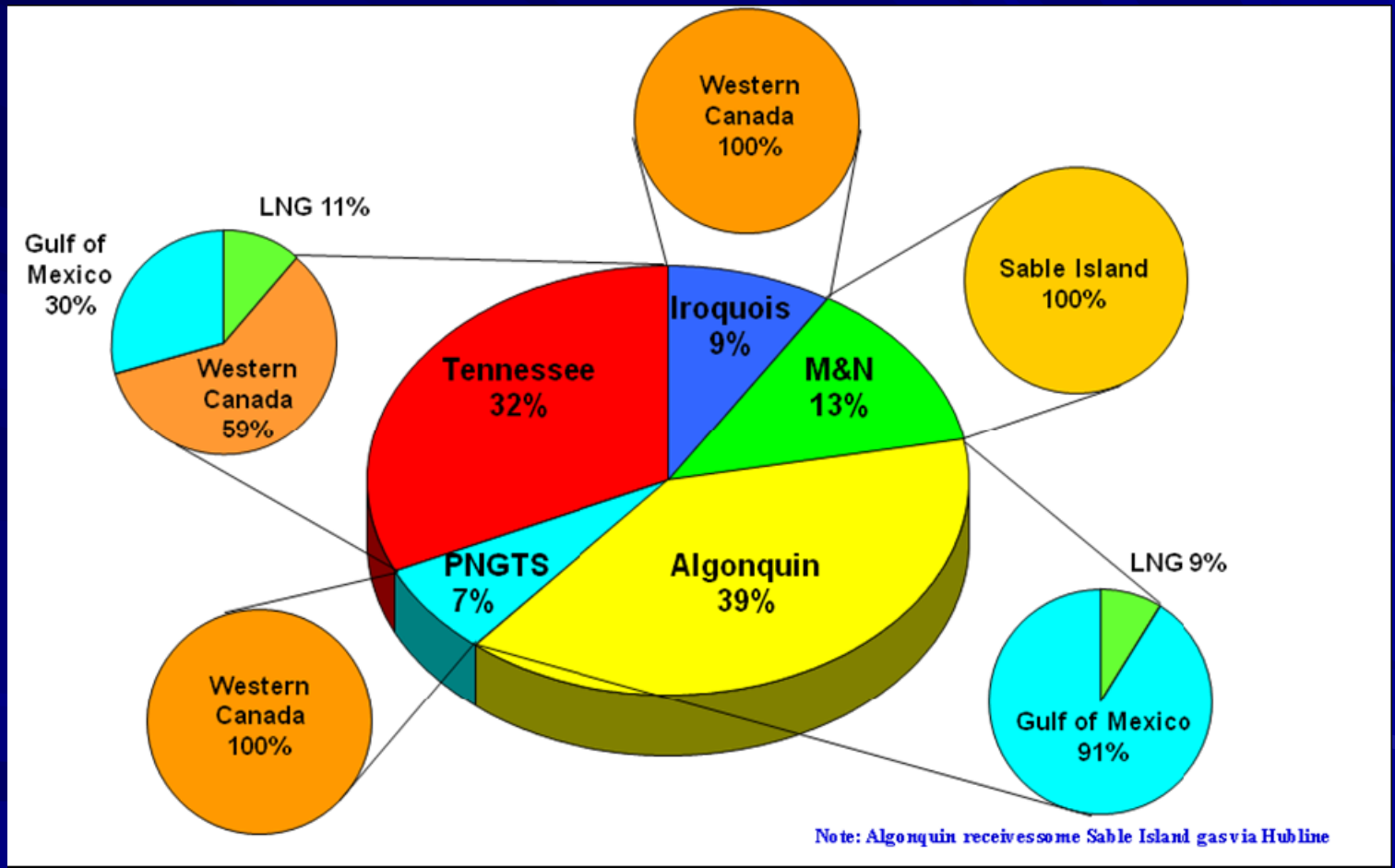
Regional Energy Context

Regional Natural Gas Supplies

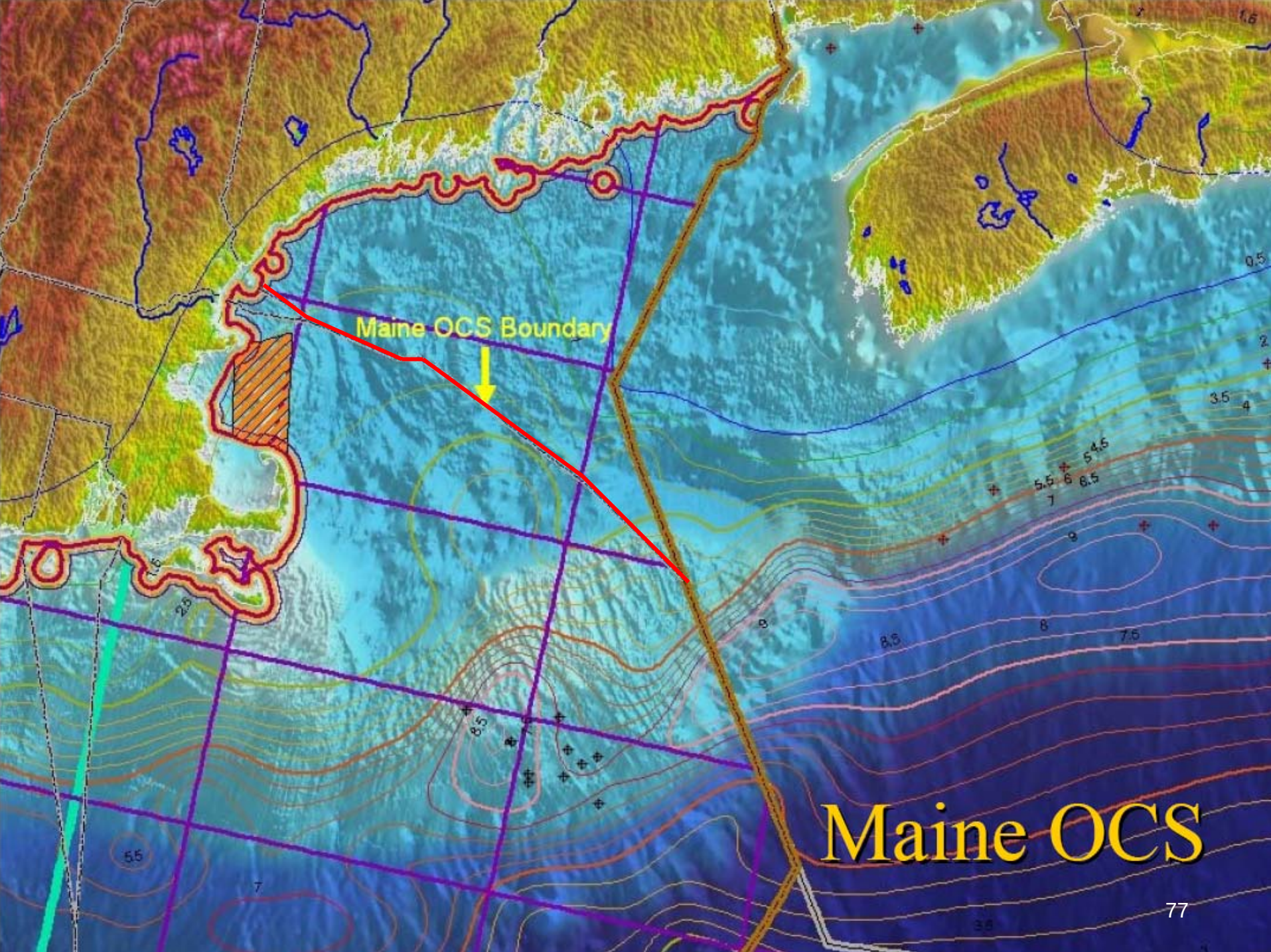
Sable Island, Nova Scotia
- Discovered in 1979
- 3 TCF Gas Reserves
- Currently in Decline
- Deep Panuke Discovered in 1998



Approximate Source of NE Natural Gas in 2008

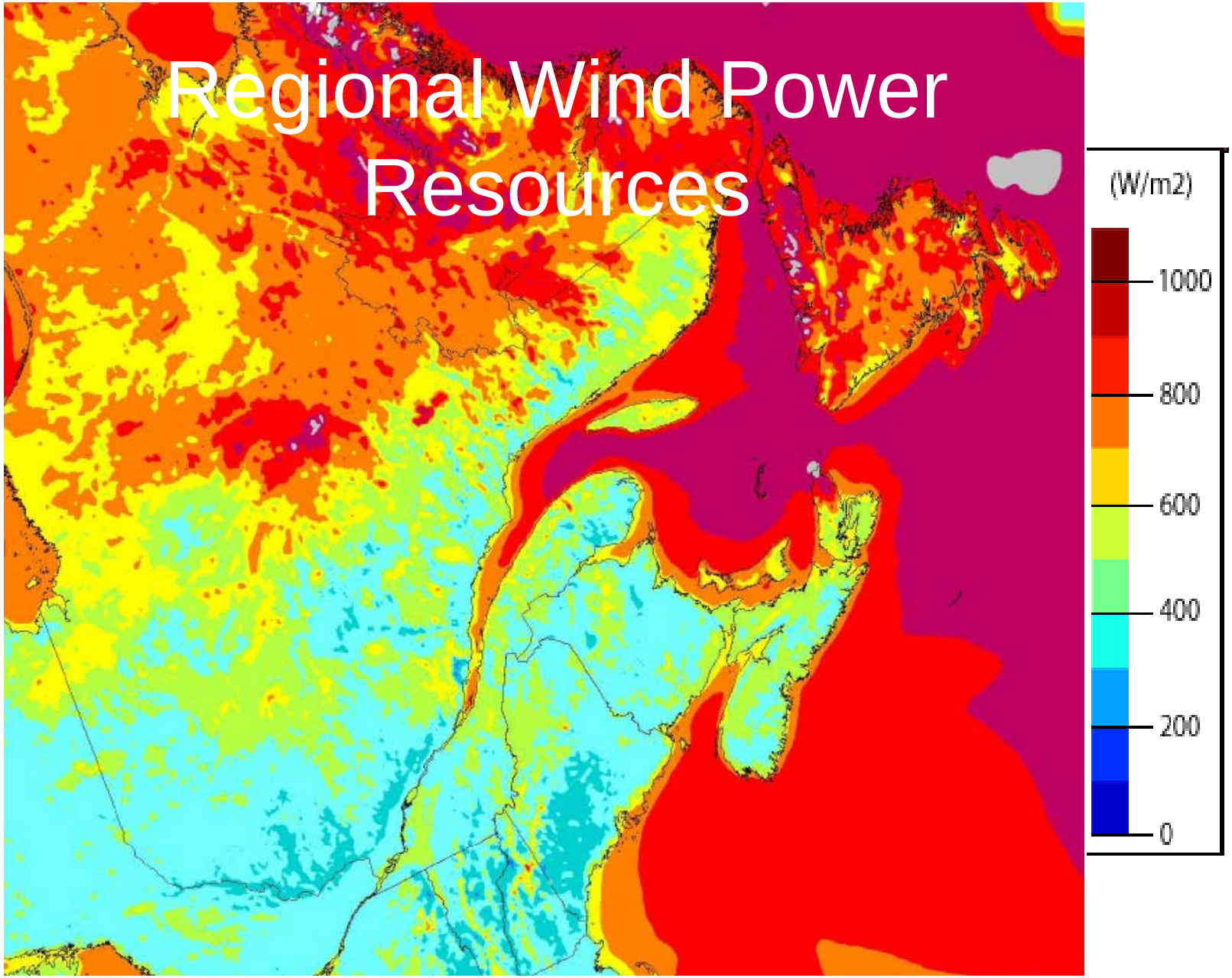


Source: ISO-NE


Maine OCS Boundary
Maine OCS

Source:
Canadian Wind
Energy Atlas

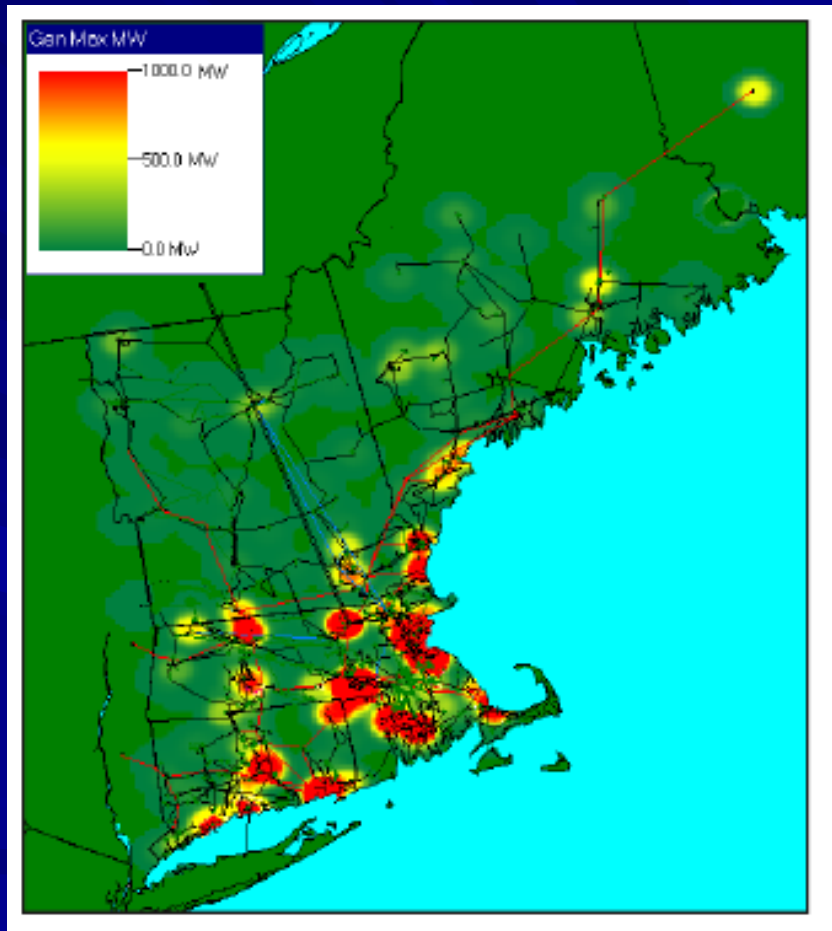
Regional Wind Power Resources



Wind Resources in Northern New England and Eastern Canada

Regional Electric Load

- ISO-NE
  - MA: 45%
  - CT: 26%
  - RI: 6%
  - NH: 9%
  - ME: 9%
  - VT: 5%



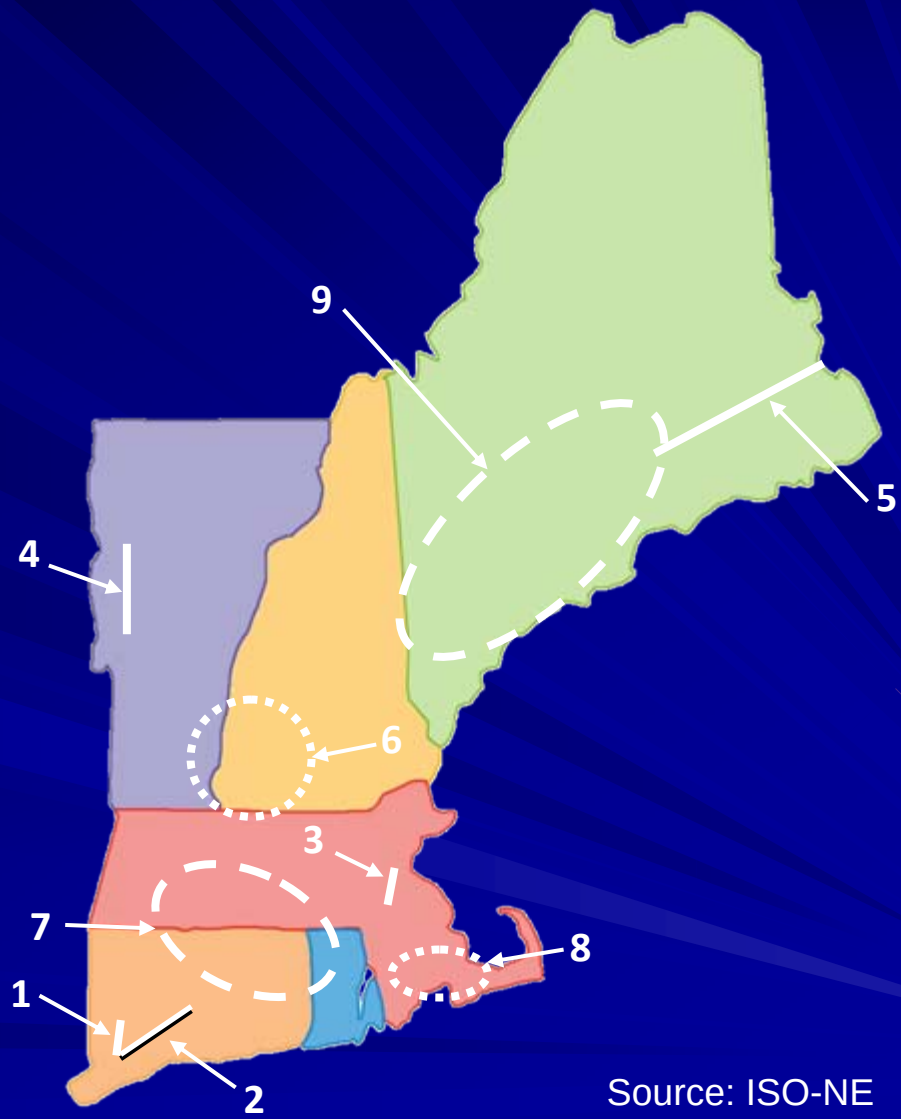
Regional Electric Transmission RELIABILITY PROJECTS

1. Southwest CT Phase I
2. SWCT Phase II
3. NSTAR 345 kV Project, Phase I and II
4. Northwest Vermont
5. Northeast Reliability Interconnect
6. Monadnock Area
7. New England East-West Solution
8. Southeast Massachusetts
9. Maine Power Reliability Program

In service

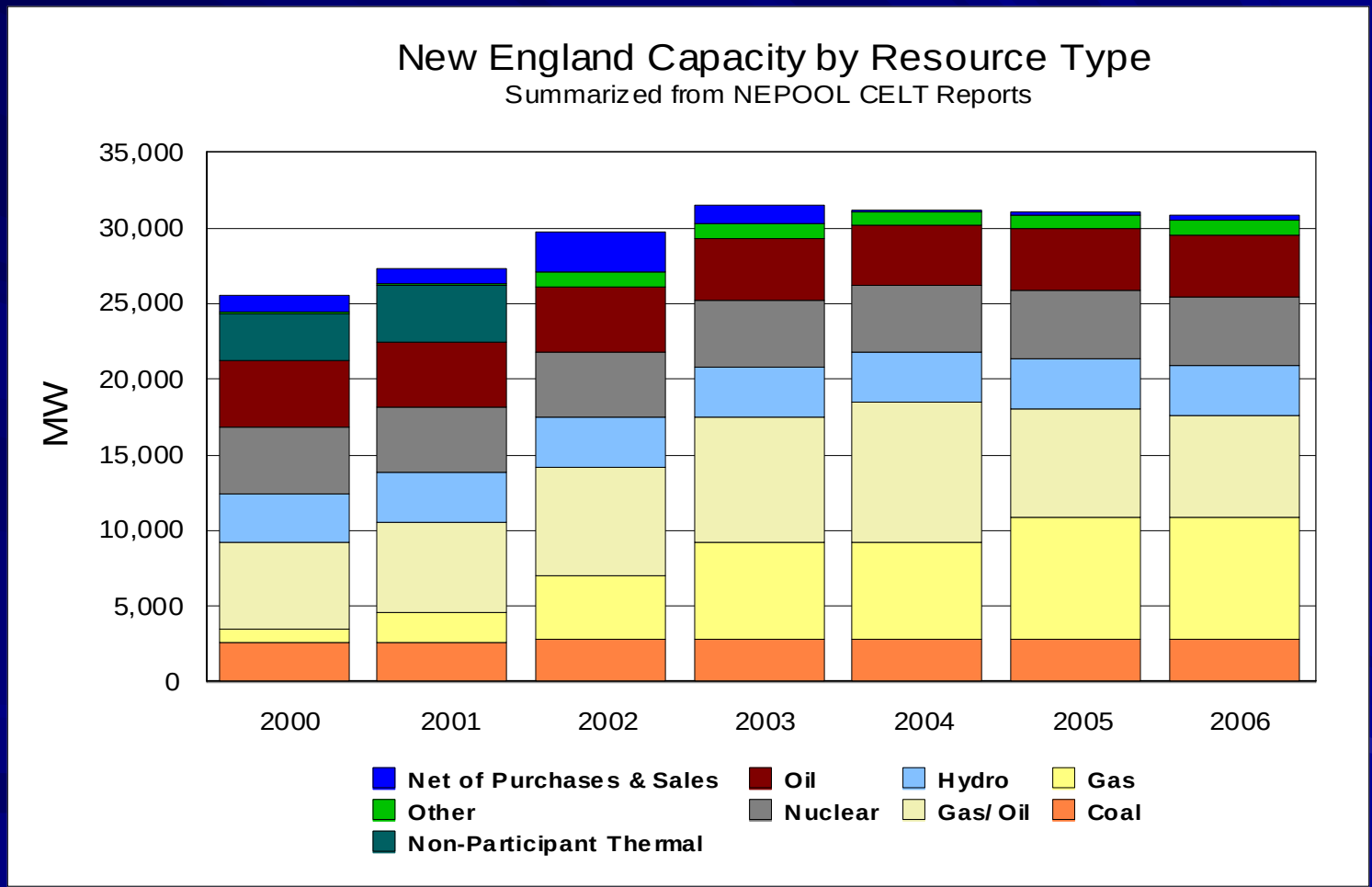
Under construction

Under study



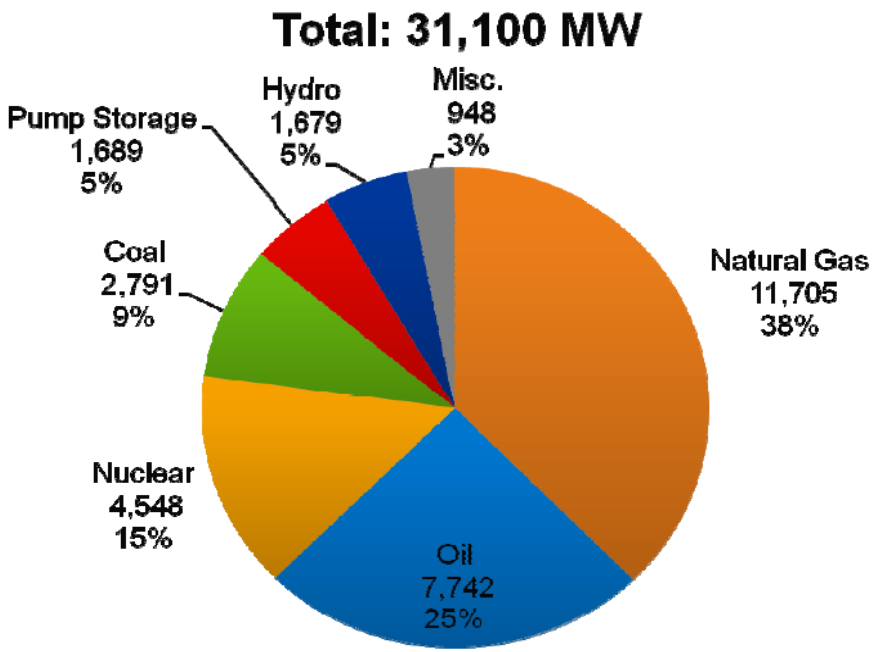
Source: ISO-NE

New England Electricity Generation Capacity



New England Electric Generation Capacity by Fuel Type

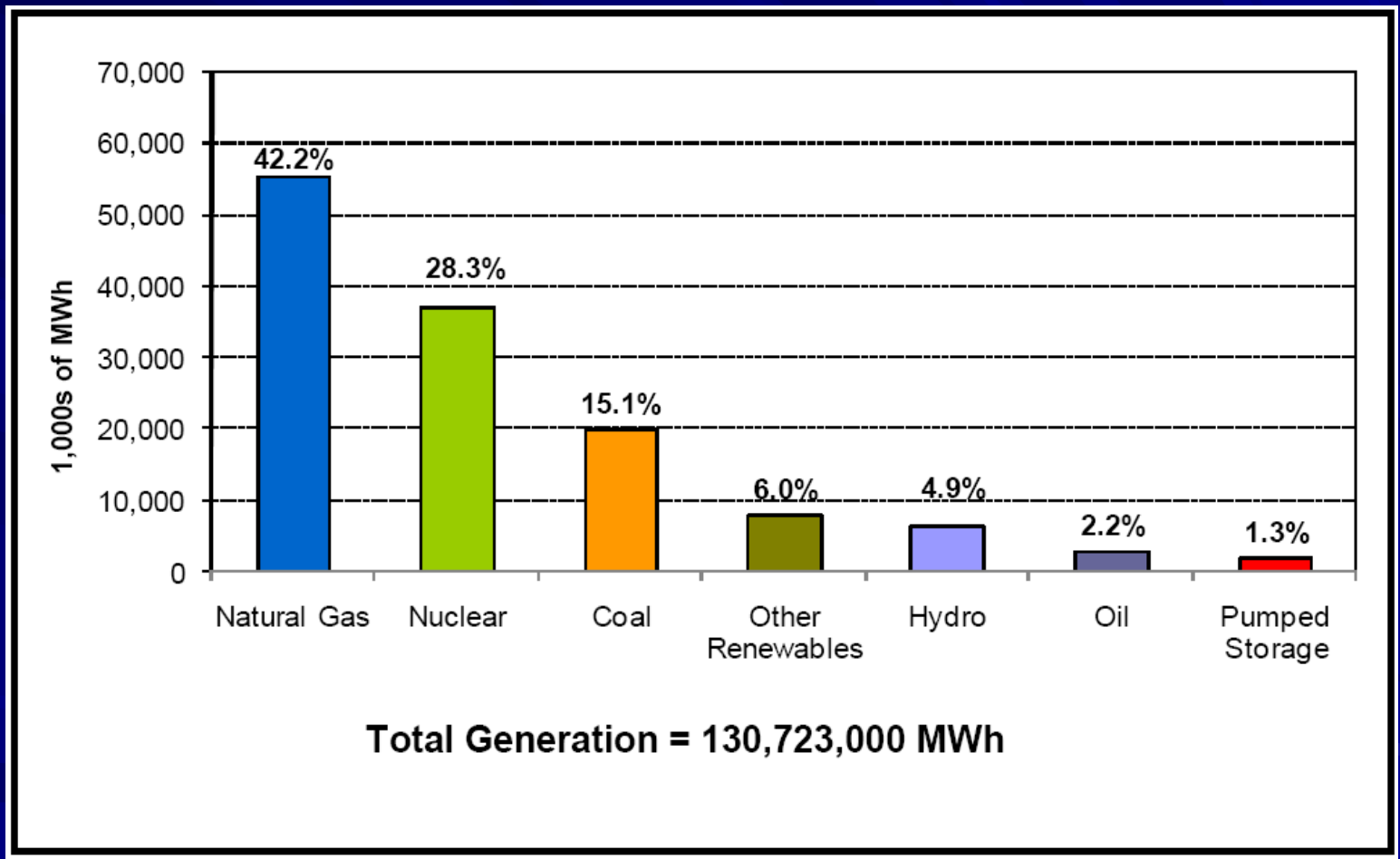
Reliance on Gas and Oil is Significant



Misc. includes: landfill gas, other biomass gas, municipal solid waste, wood, wind and tire-derived fuel

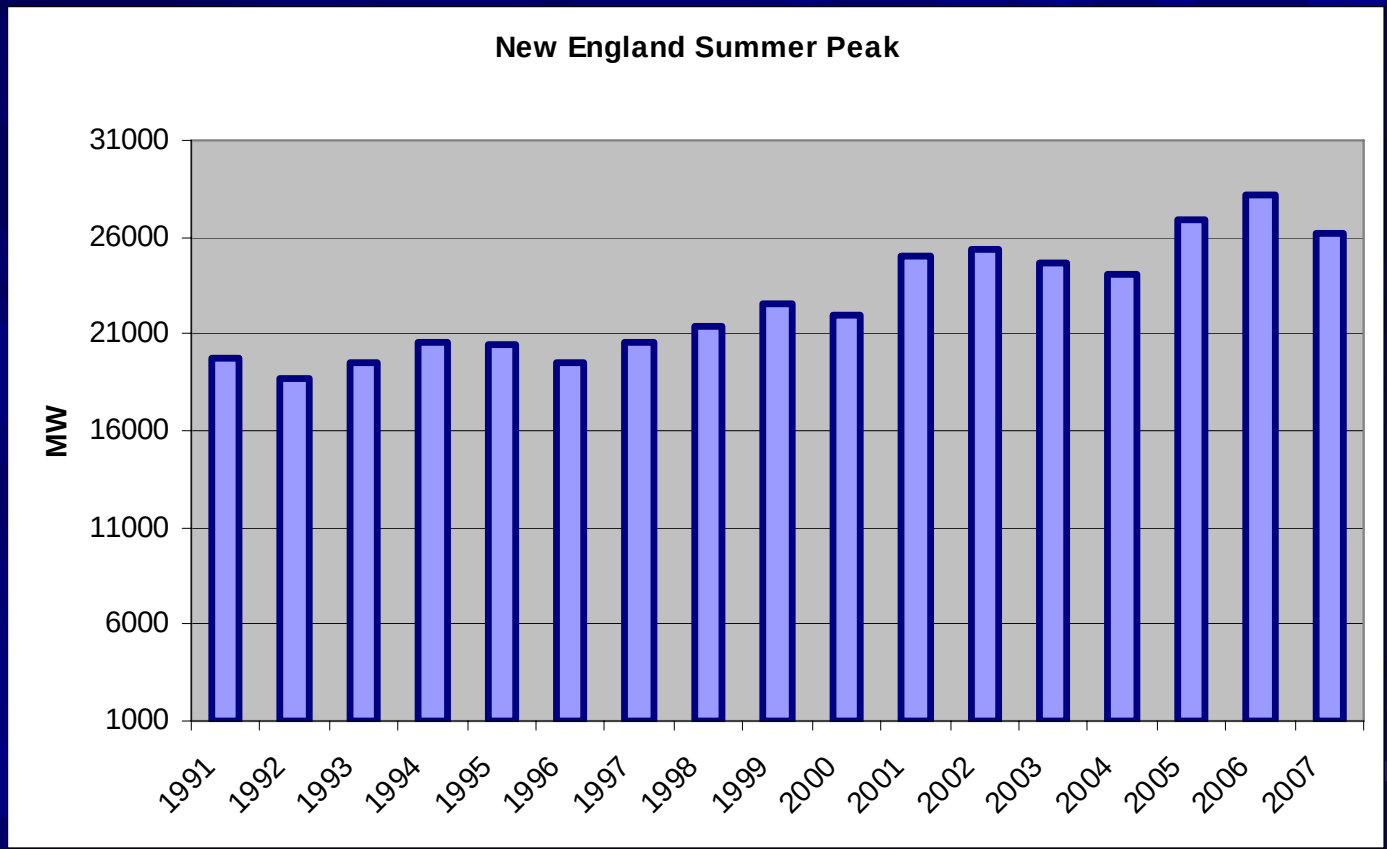
Source: ISO-NE

New England Electric Generation by Fuel Type



Source: ISO-NE

New England Peak Electric Demand

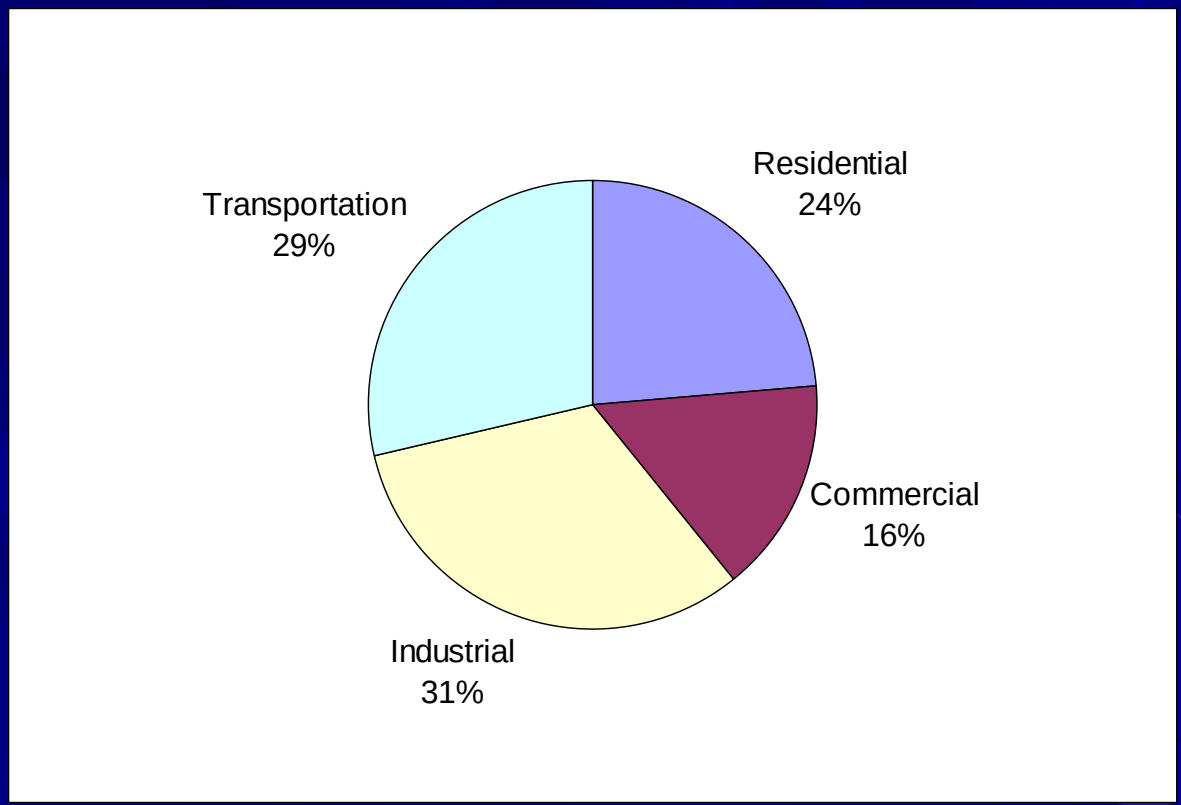


Source: ISO-NE

Maine Energy Profile

Maine Energy Consumption by Sector 2006

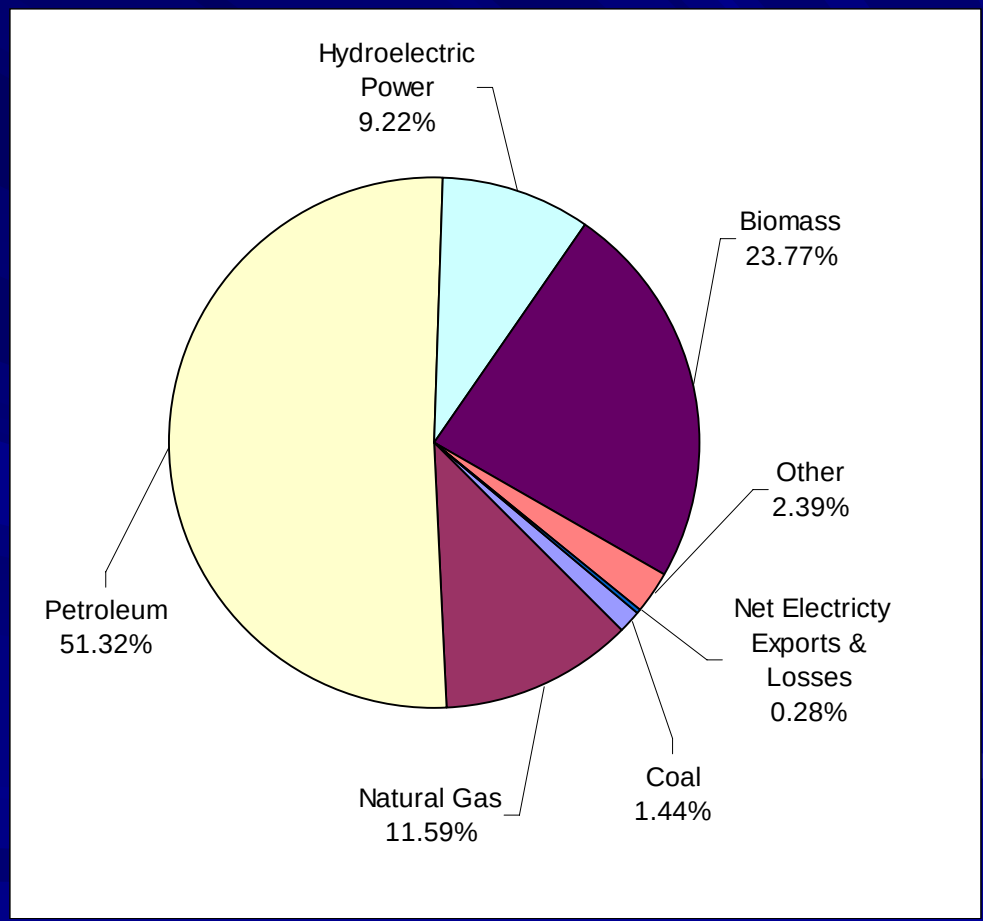
End-Use Sectors	Trillion BTU
Residential	108
Commercial	71
Industrial	147
Transportation	131
Total	**458**



Source: EIA

Maine Consumption by Source, 2006

Source	Trillion Btu
Coal	6.6
Natural Gas	53.3
Petroleum	236
Hydroelectric Power	42.4
Biomass	109.3
Other*	11
Net Electricity Exports & Losses	1.3
Total Energy	458



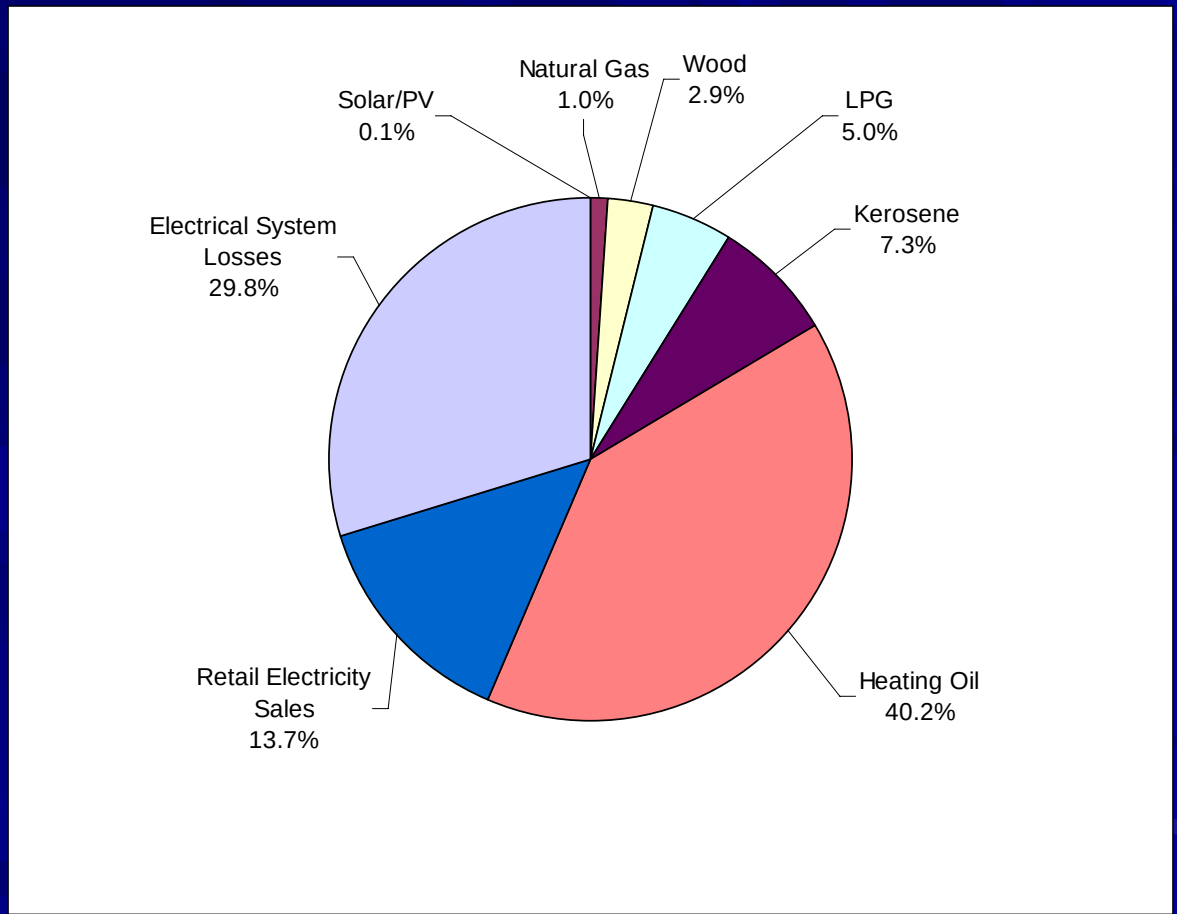
Source: EIA

* Other includes: "Other" is geothermal, wind, photovoltaic, solar thermal energy, and net imports of electricity.

Maine Residential Consumption

2006

Source	Trillion Btu
Solar/PV	0.1
Natural Gas	1.1
Wood	3.1
LPG	5.4
Kerosene	7.9
Heating Oil	43.3
Retail Electricity Sales	14.8
Electrical System Losses	32.1
Total	**107.9**

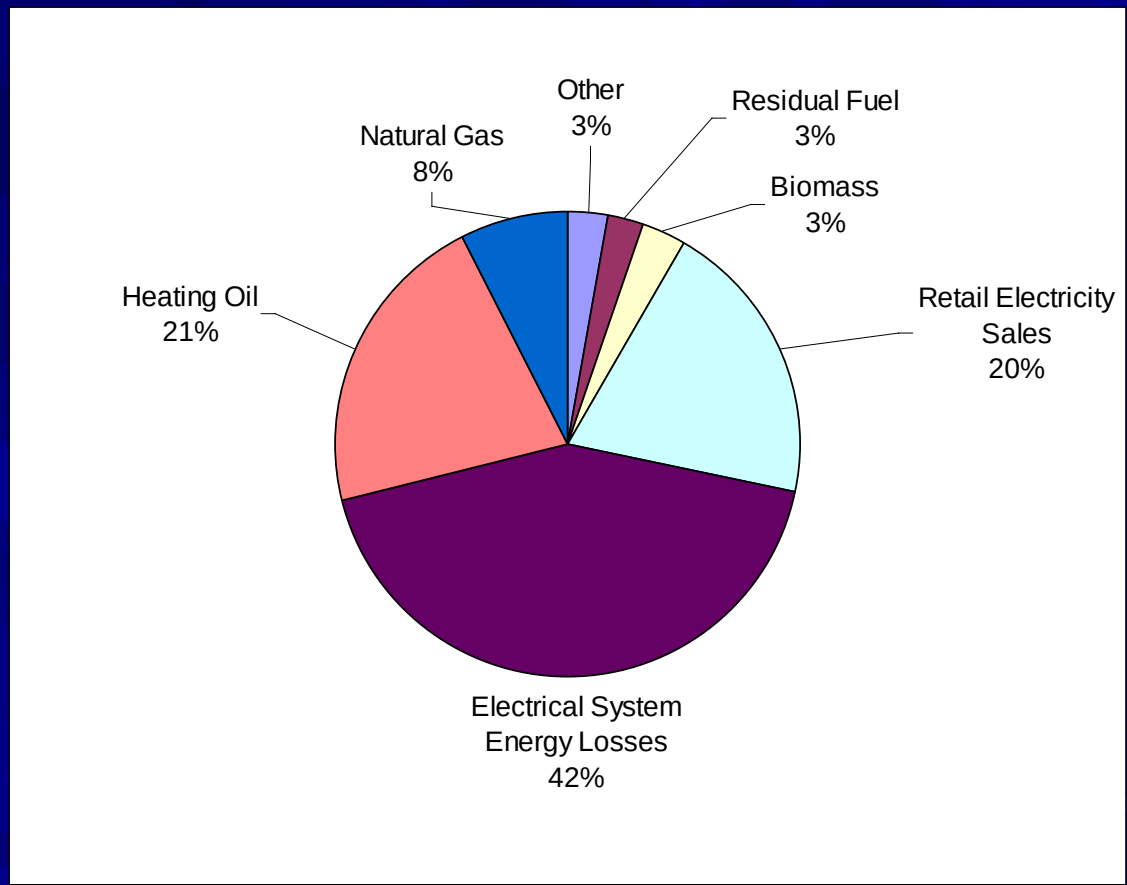


Source: EIA

Maine Commercial Energy Consumption

2006

Source	Trillion Btu
Other*	2
Residual Fuel	1.8
Biomass	2.2
Retail Electricity Sales	14.1
Electrical System Energy Losses	30.5
Heating Oil	15.2
Natural Gas	5.4
TOTAL	71.2

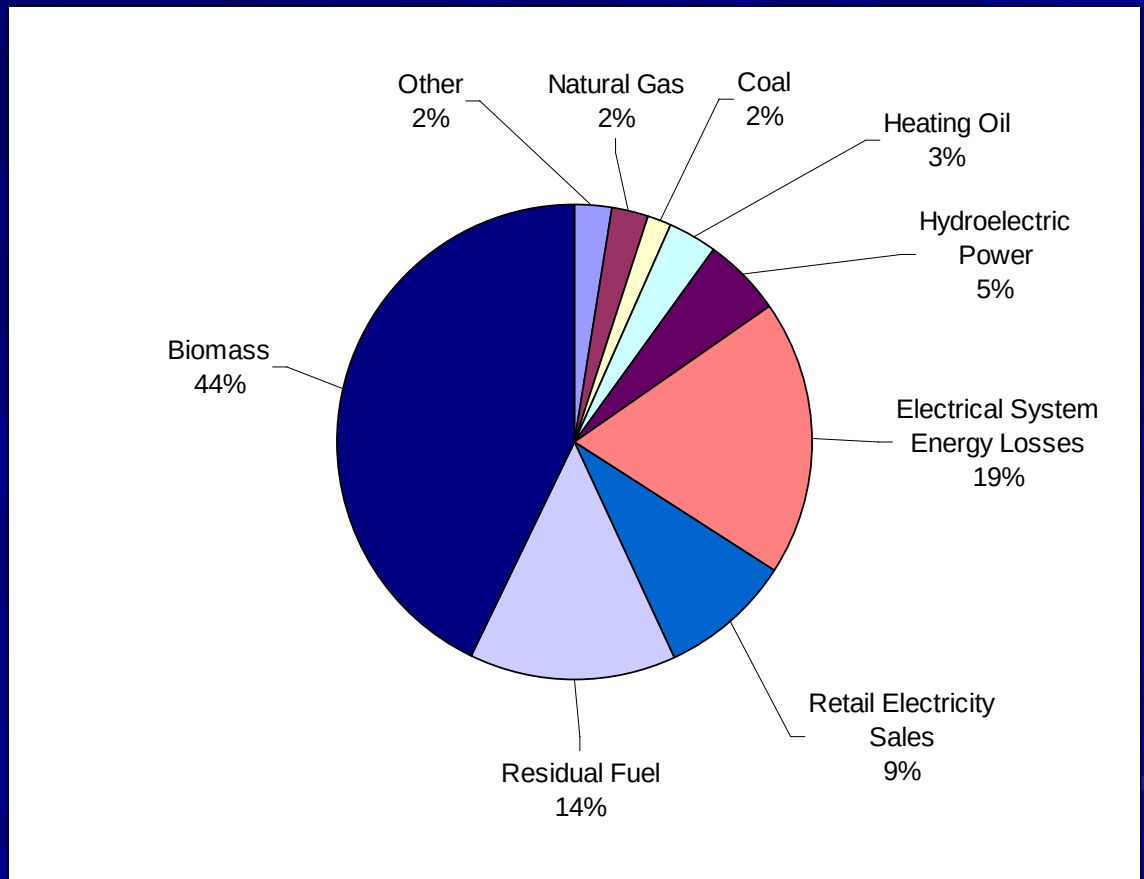


Source: EIA

*Other includes: Motor Gasoline, LPG and Kerosene

Maine Industrial Sector Energy Consumption Estimates, 2006

Source	Trillion Btu
Other*	3.6
Natural Gas	3.6
Coal	2.8
Heating Oil	4.8
Hydroelectric Power	7.7
Electrical System Energy Losses	28
Retail Electricity Sales	13
Residual Fuel	20.7
Biomass	63.1
TOTAL	**147.2**



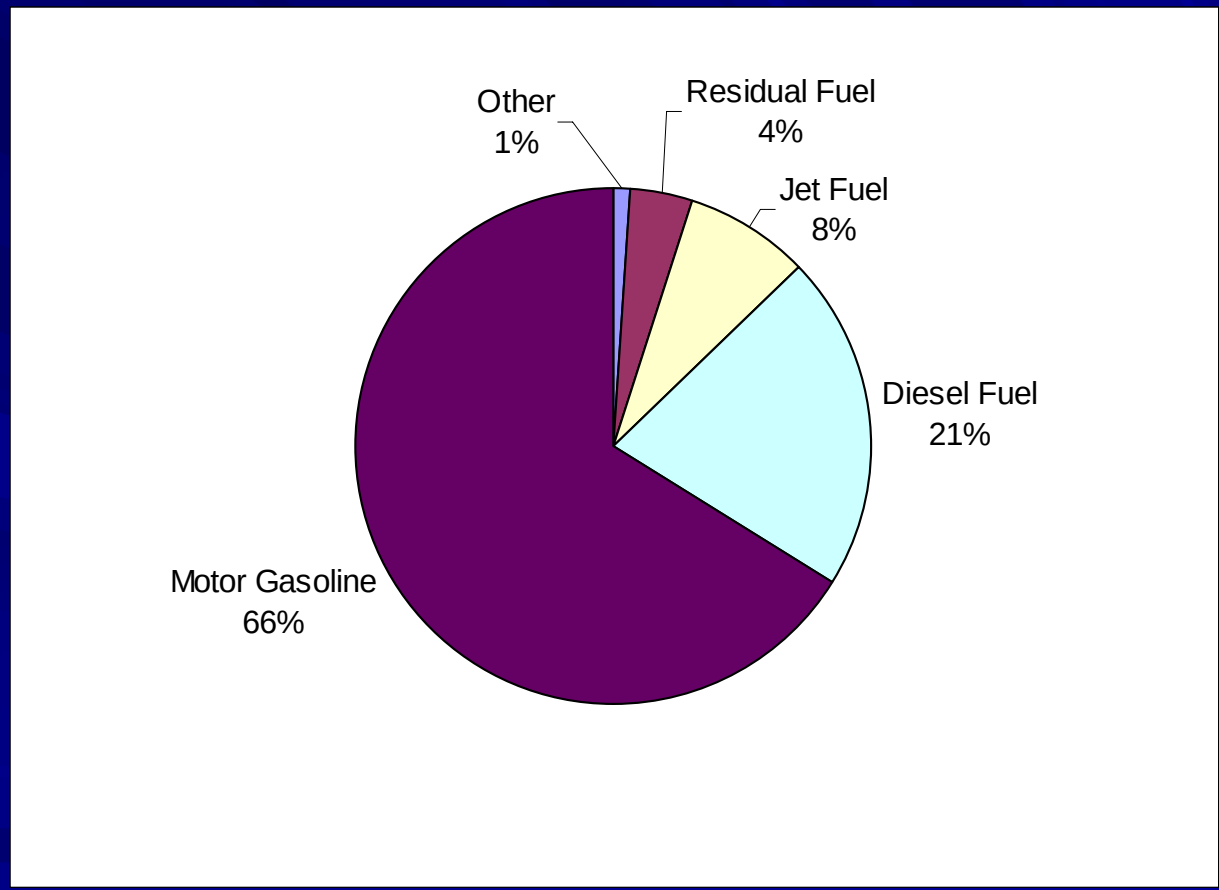
Source: EIA

*Other includes: Petcoke, Lubricants, Kerosene, LPG, Gasoline, Asphalt, and Road Oil

Maine Transportation Sector Energy Consumption

2006

Source	Trillion Btu
Other*	1.6
Residual Fuel	5.1
Jet Fuel	10.1
Diesel Fuel	27.6
Motor Gasoline	87
TOTAL	**131.4**



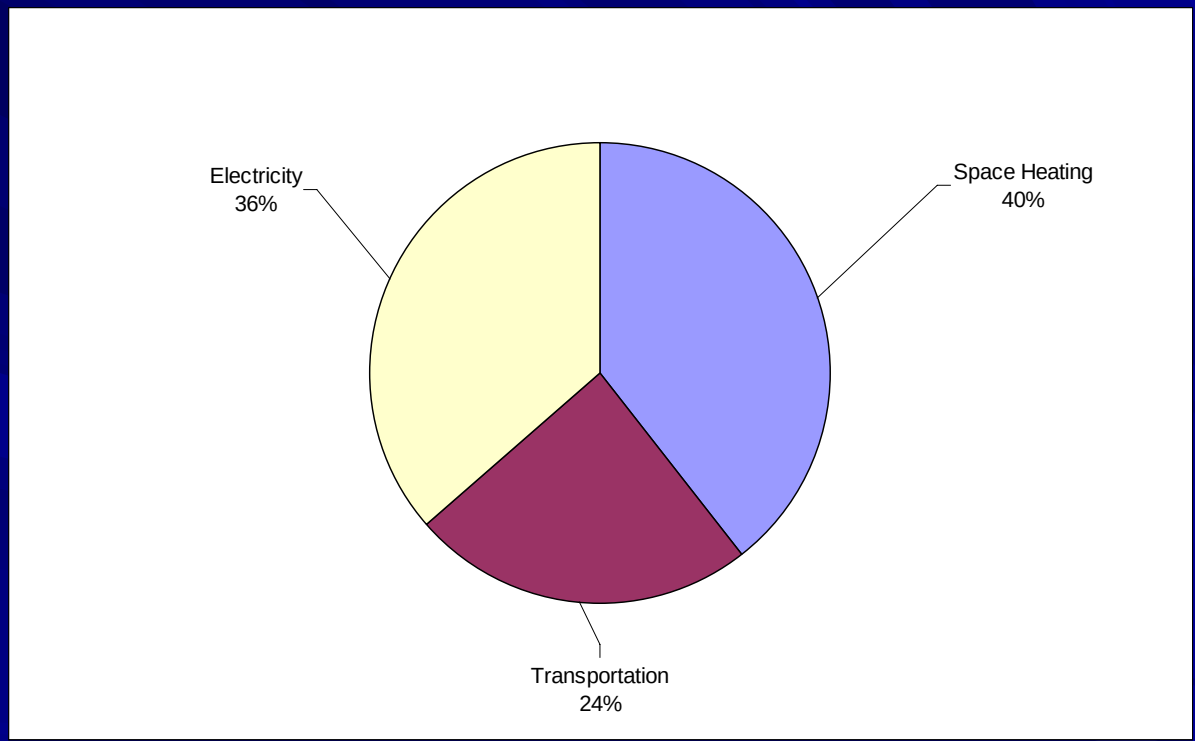
Source: EIA

Other includes: Lubricants, Petcoke, LPG, Asphalt and Road Oil

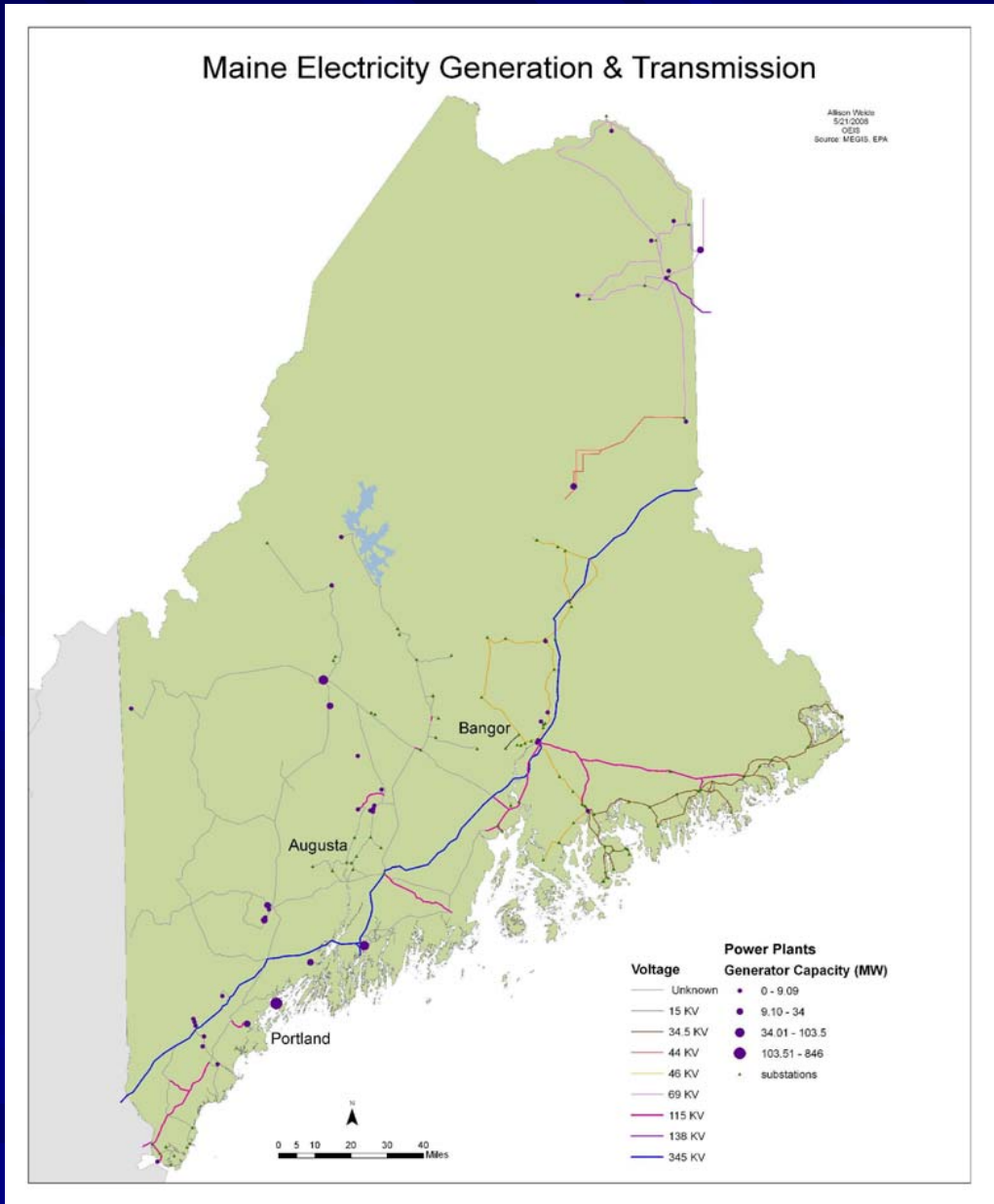
Estimated State Government Energy Expenditures

2008

Space Heating*	$54,000,000
Transportation*	$33,000,000
Electricity*	$49,000,000
Total*	**$136,000,000**



*Based on: BGS estimates for the Executive Department, University of Maine estimates and a draft survey from University of Southern Maine on energy in Maine Schools. Does not include data on the Community College system

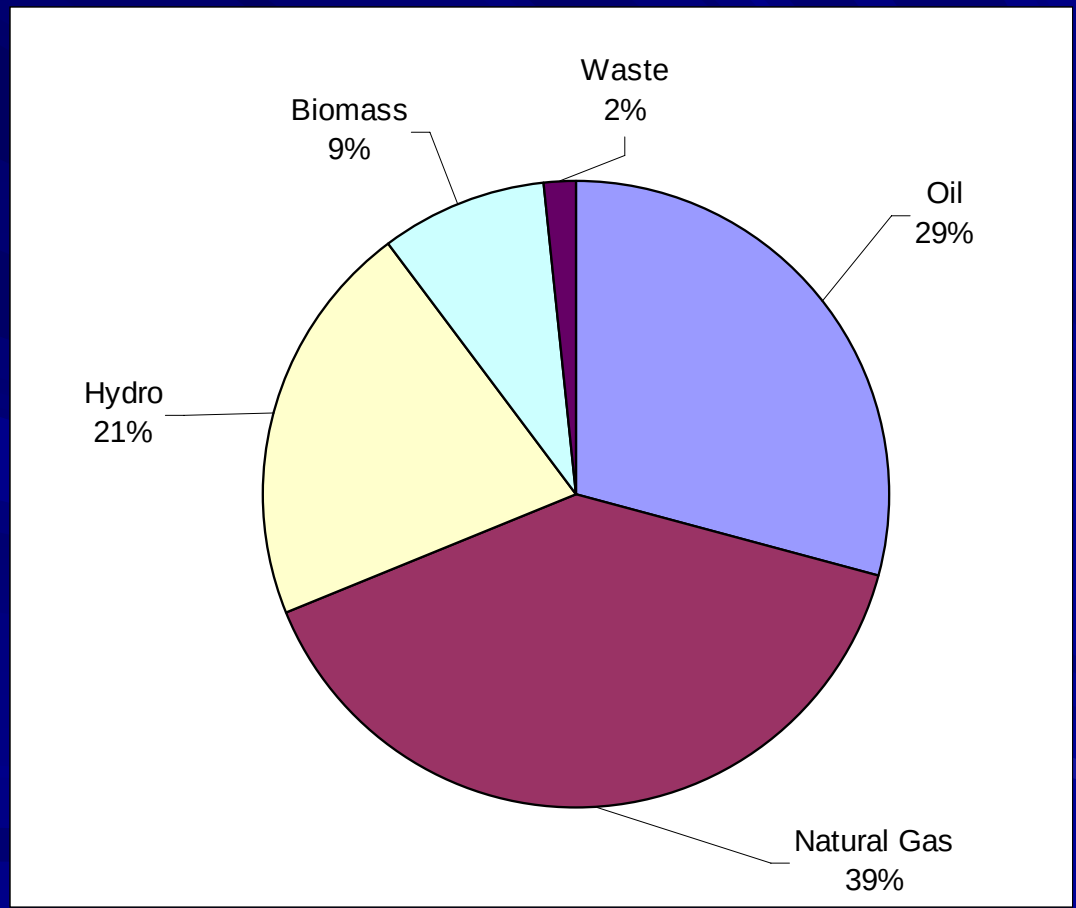


Data: Maine Office of GIS

Maine Electrical Generation Capacity

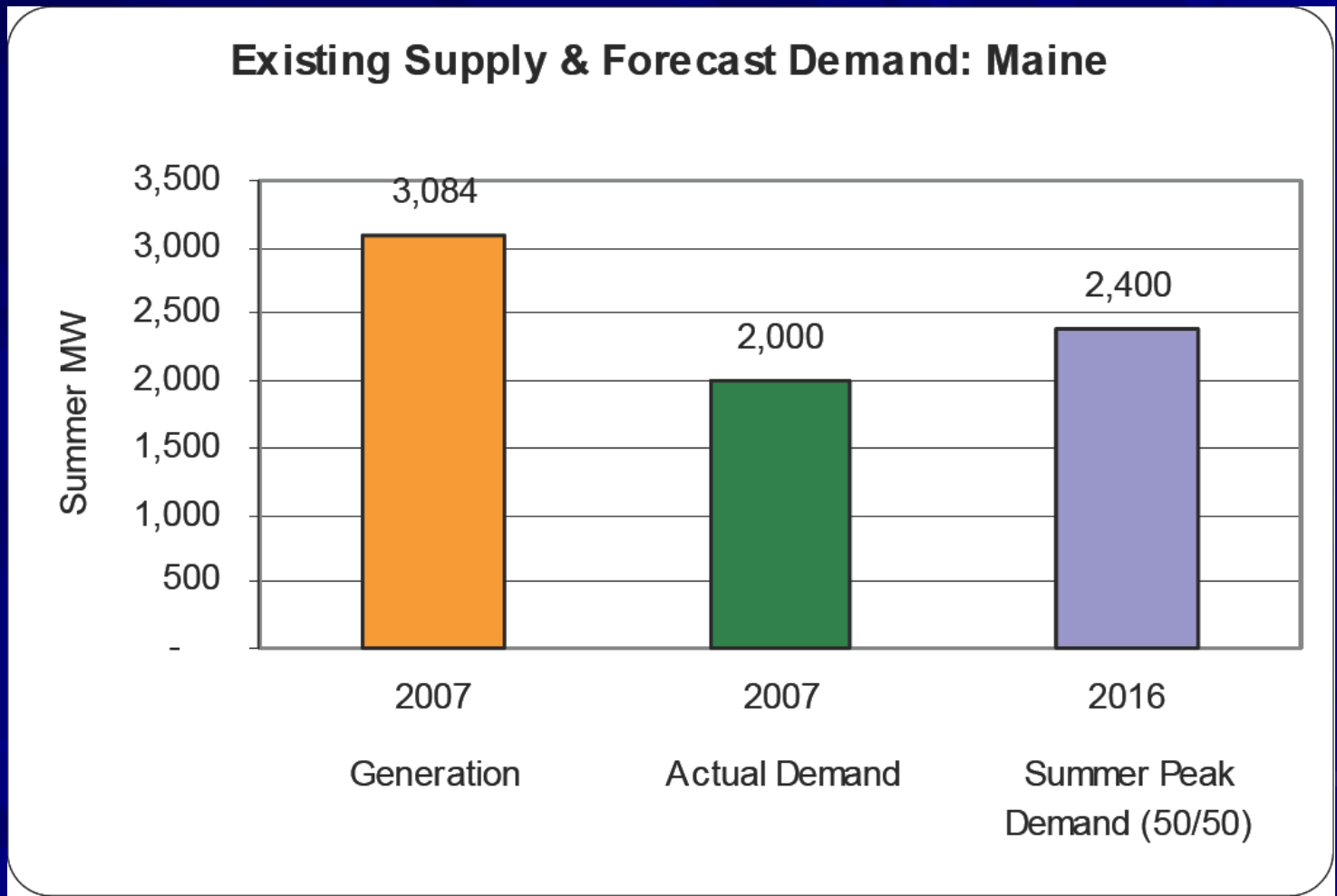
2006

Fuel Type	MW
Oil	1,006
Natural Gas	1,377
Hydro	720
Biomass	298
Waste	53
Total	3,456



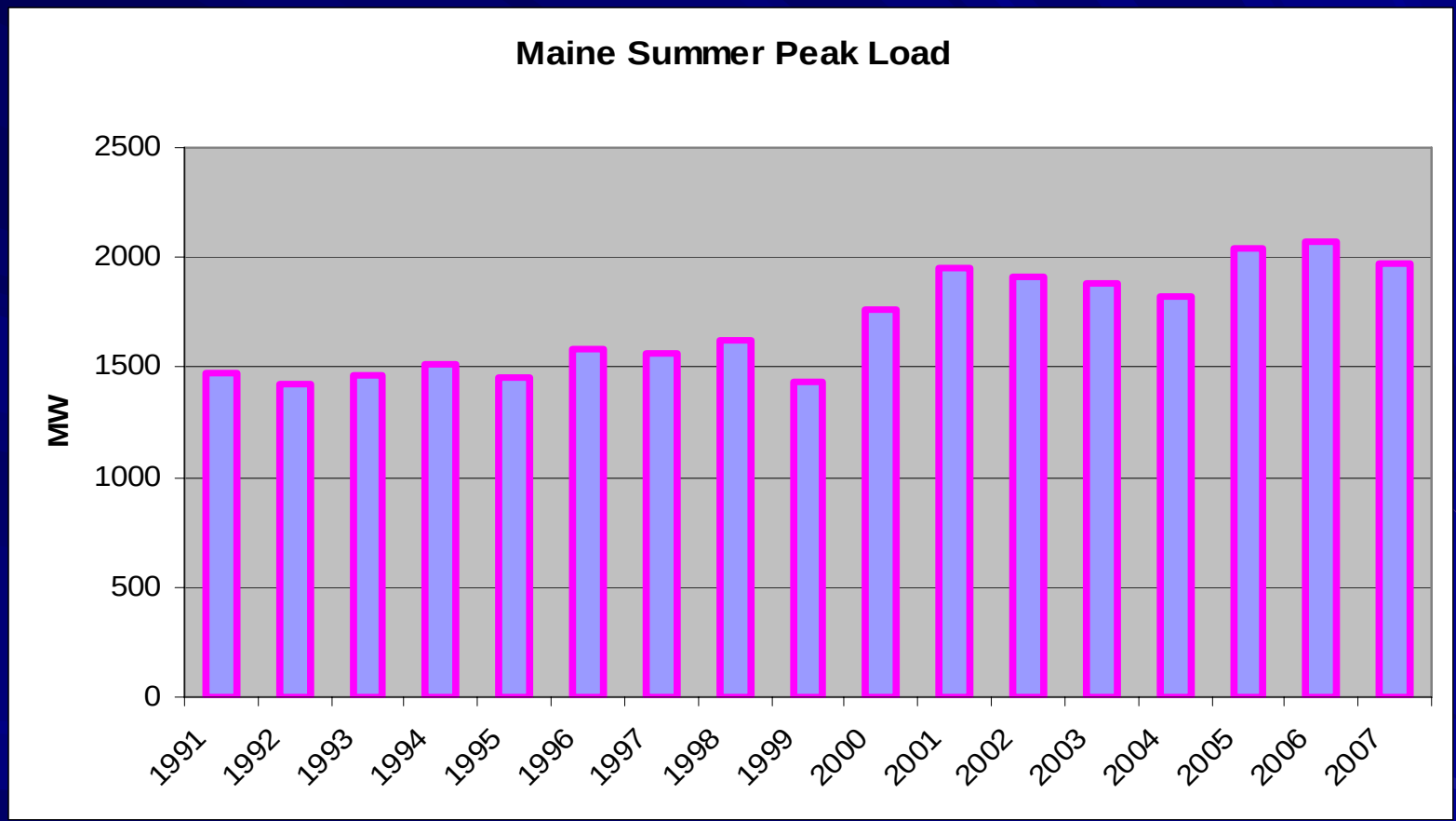
Source: EIA

Maine Peak Electric Demand



Source: ISO-NE

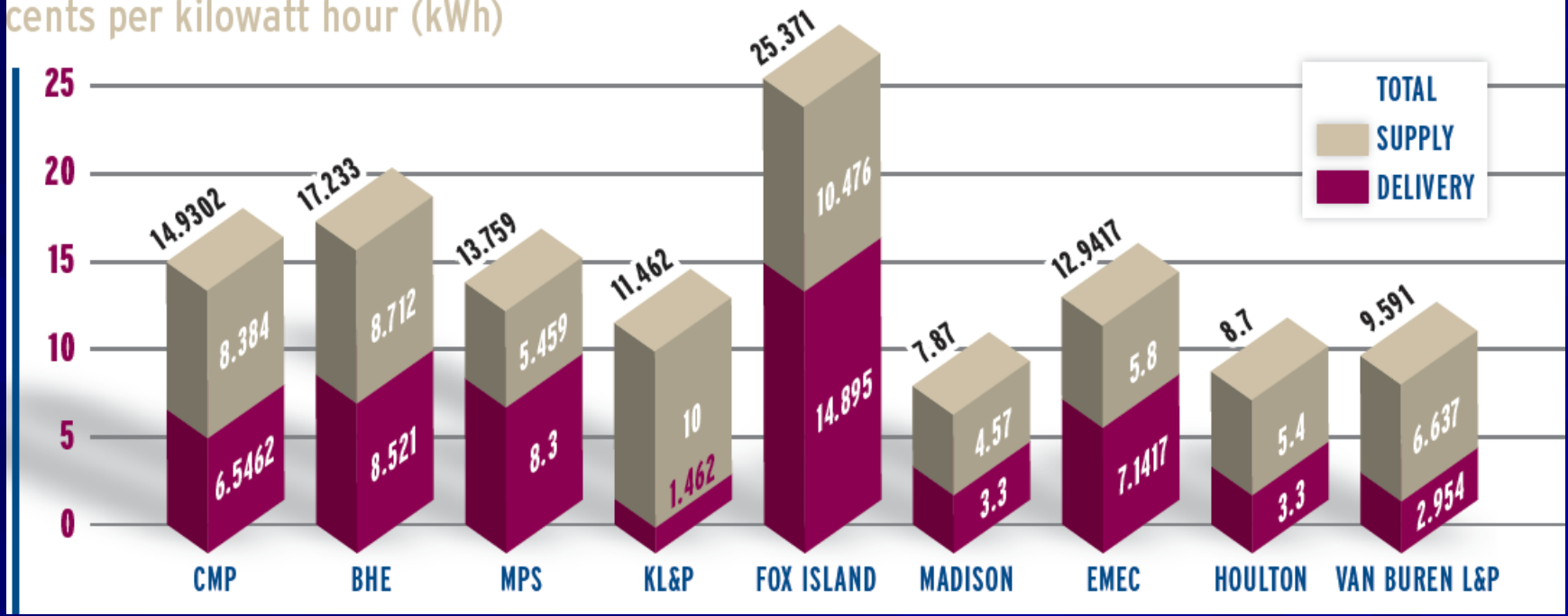
Growth of Maine Peak Electric Demand



Source: ISO-NE

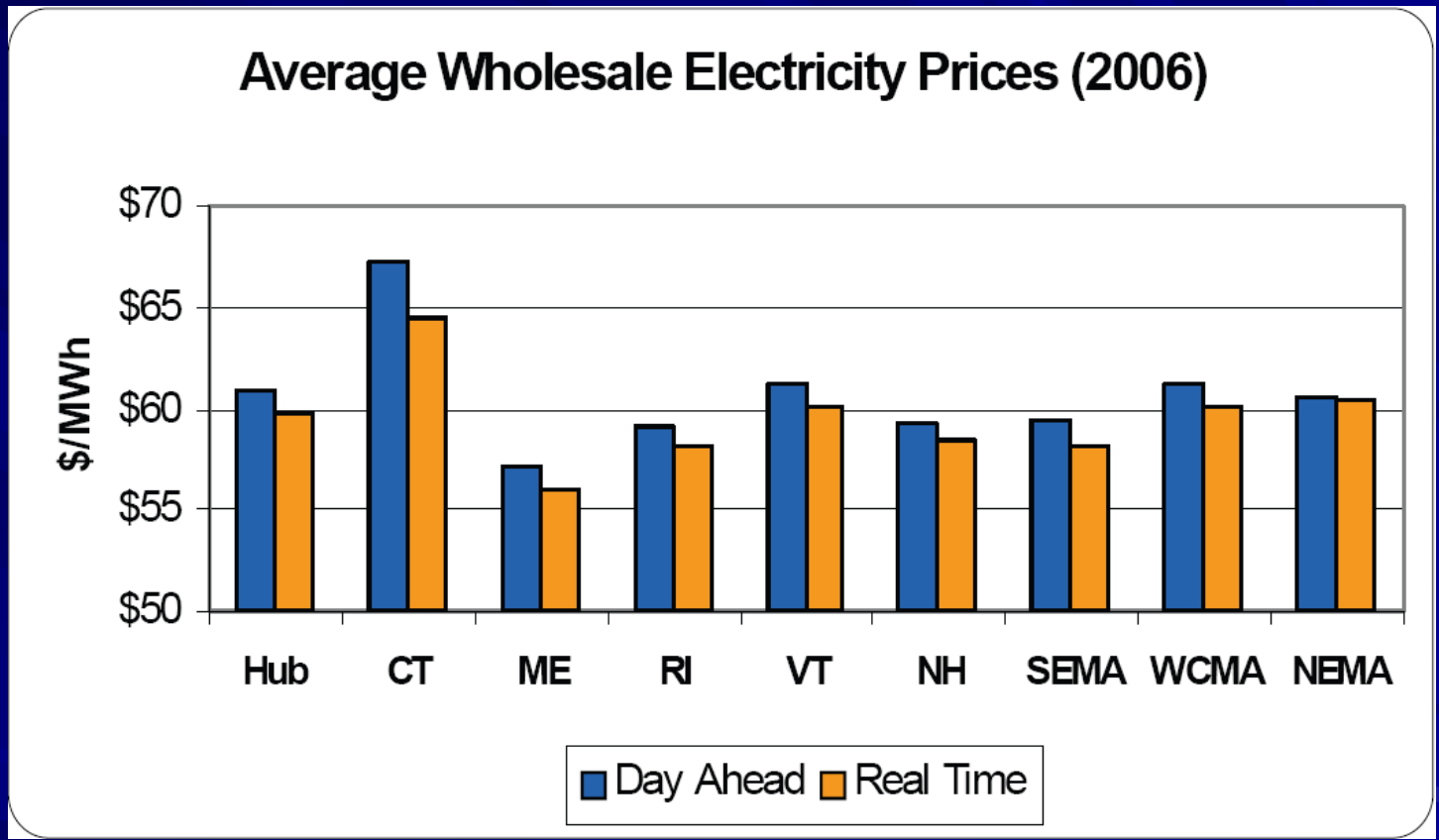
CURRENT RESIDENTIAL ELECTRIC RATES

cents per kilowatt hour (kWh)



Source: Maine Public Advocate Nov. 2008

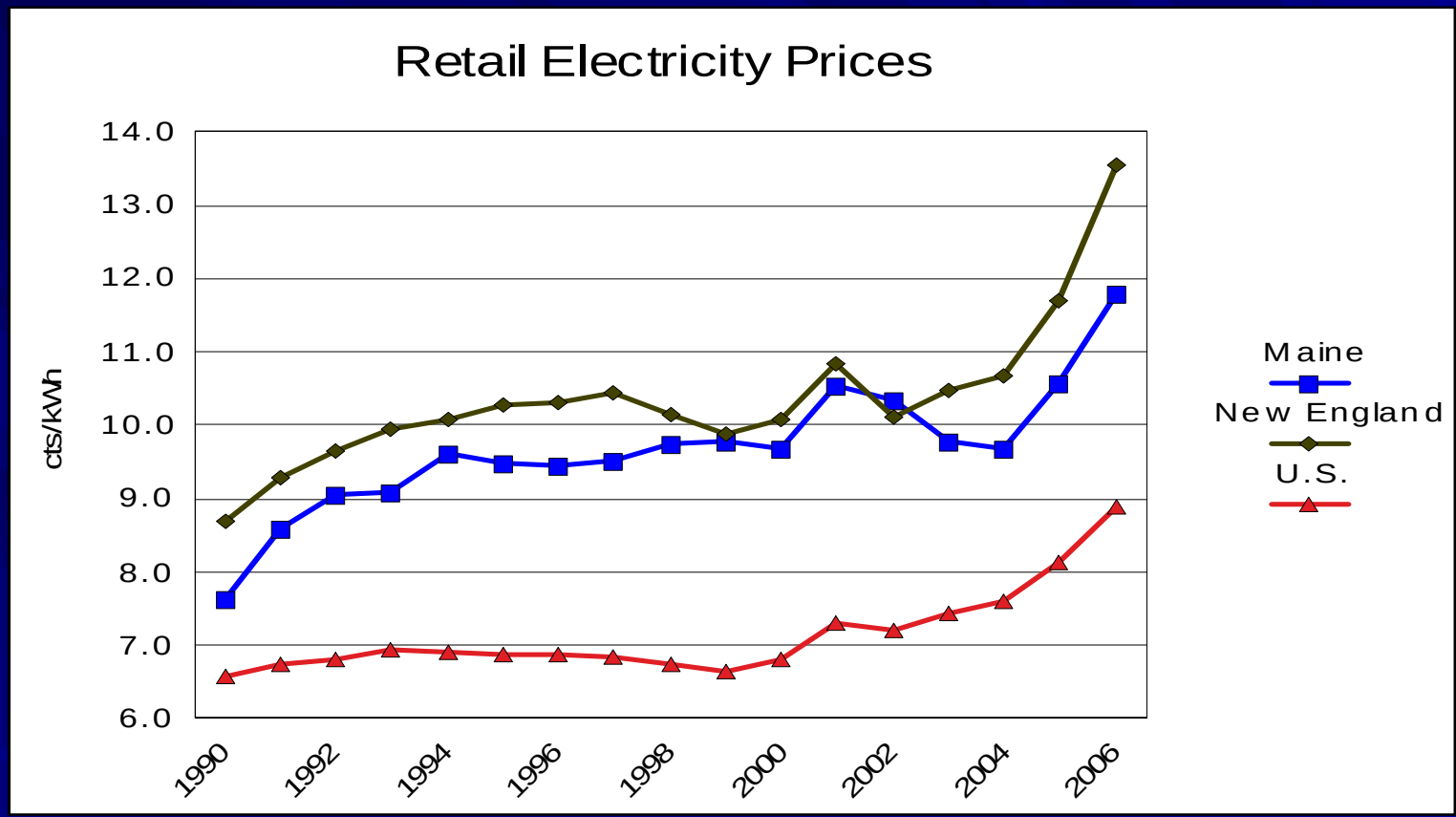
Wholesale Price of Electricity



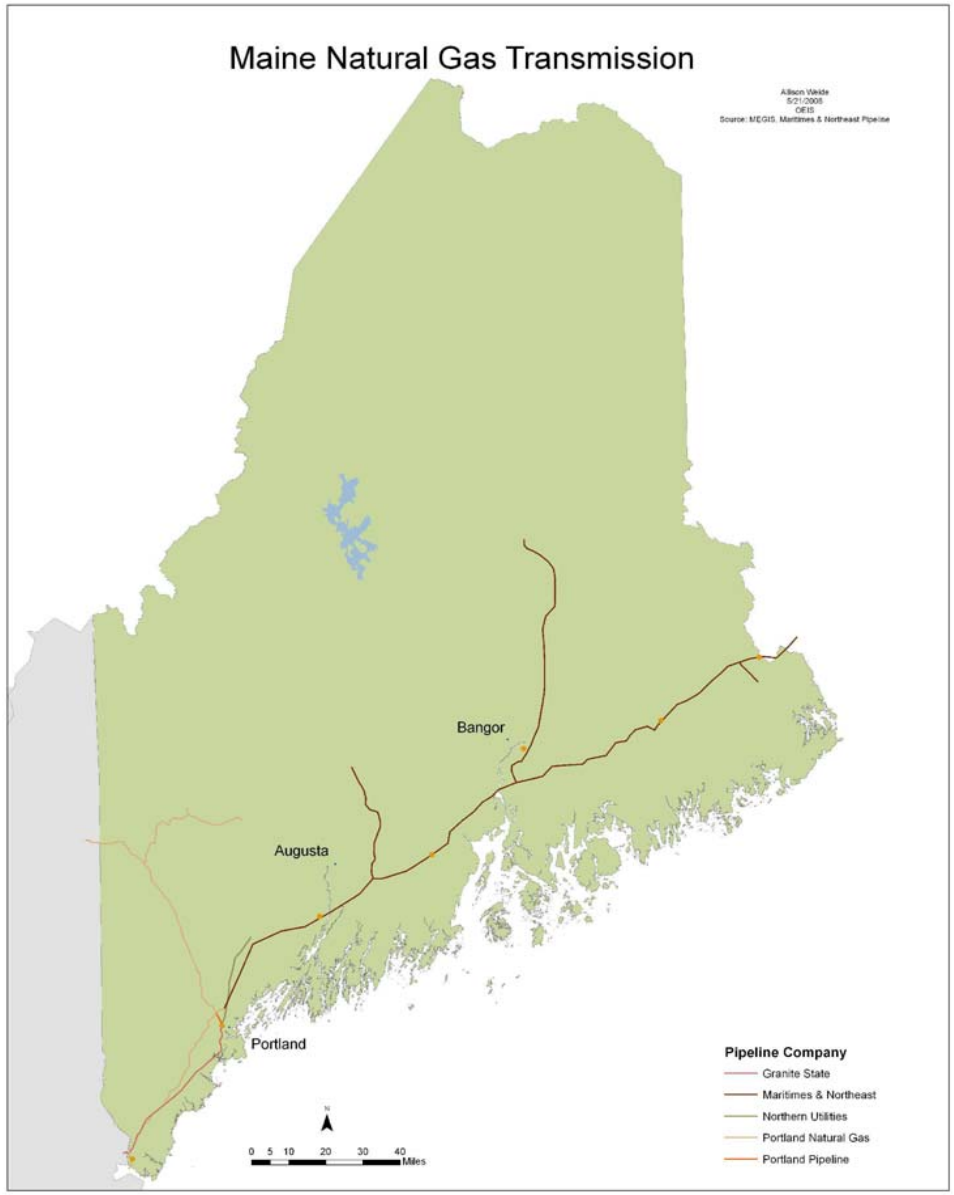
Source: ISO-NE

Delivered Price of Electricity

1990-2006



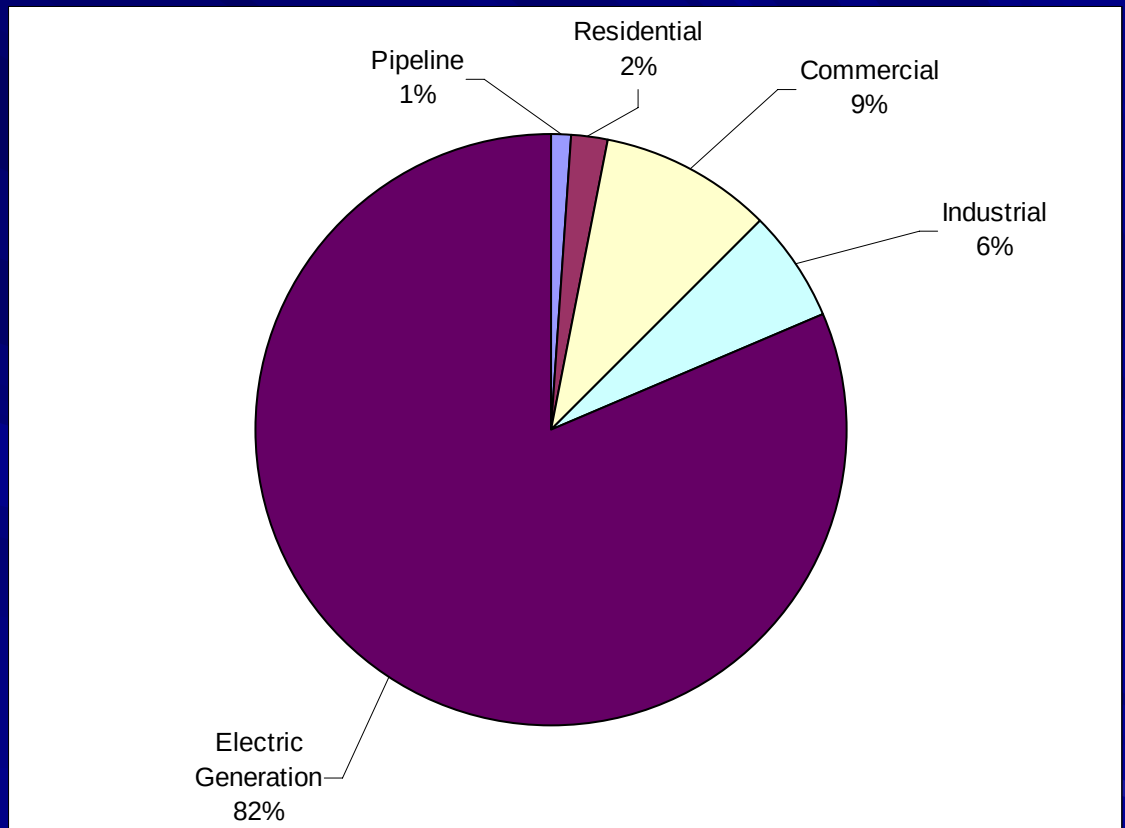
Source: Maine PUC



Data: Maine Office of GIS

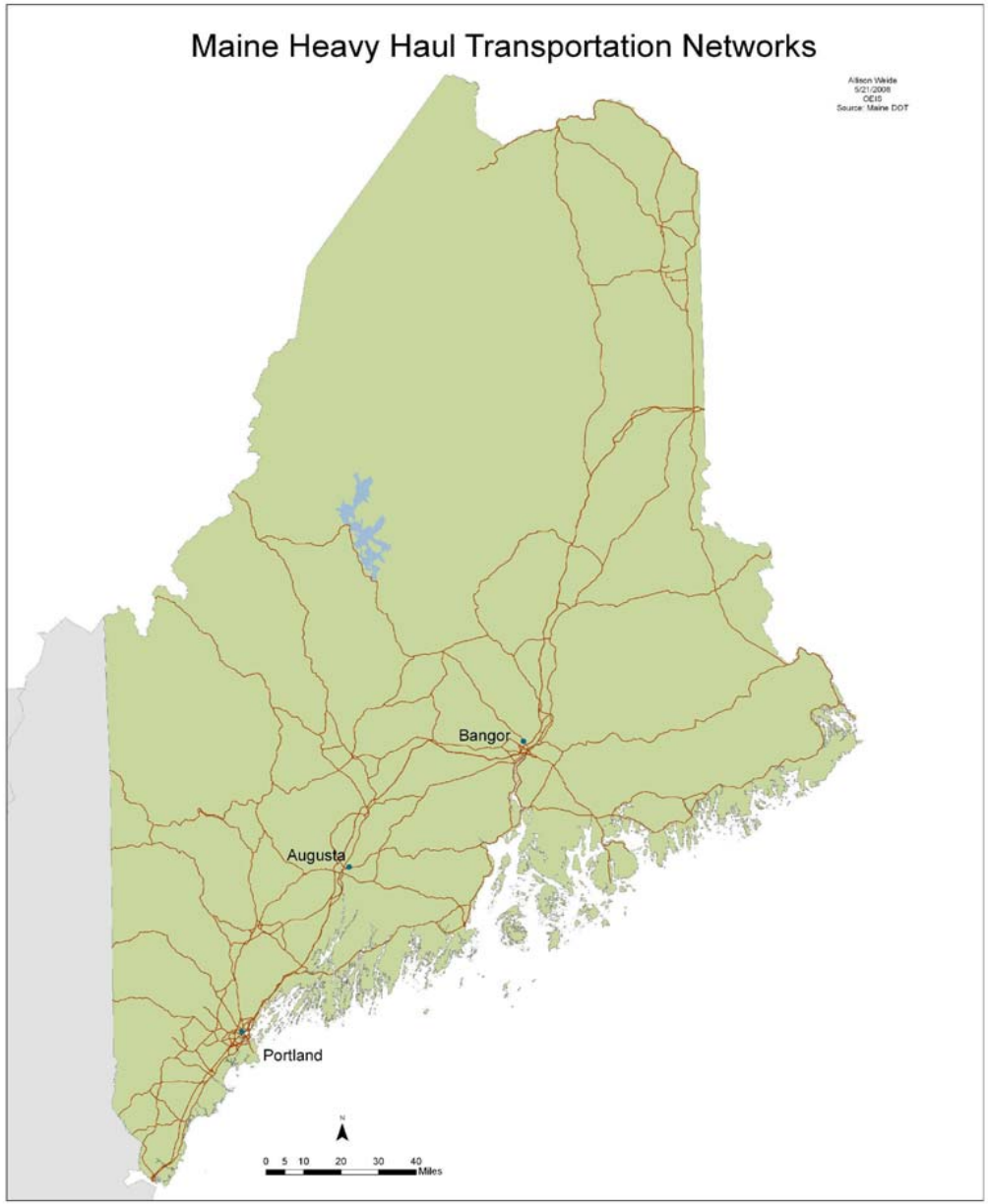
Maine Natural Gas Consumption By Sector

Sector	MMcf
Pipeline	493
Residential	985
Commercial	4,700
Industrial	3,084
Electric Generation	40,341
Total	**49,604**



Source: EIA

Maine's Heavy Haul Highway Network (100,000 LBs)

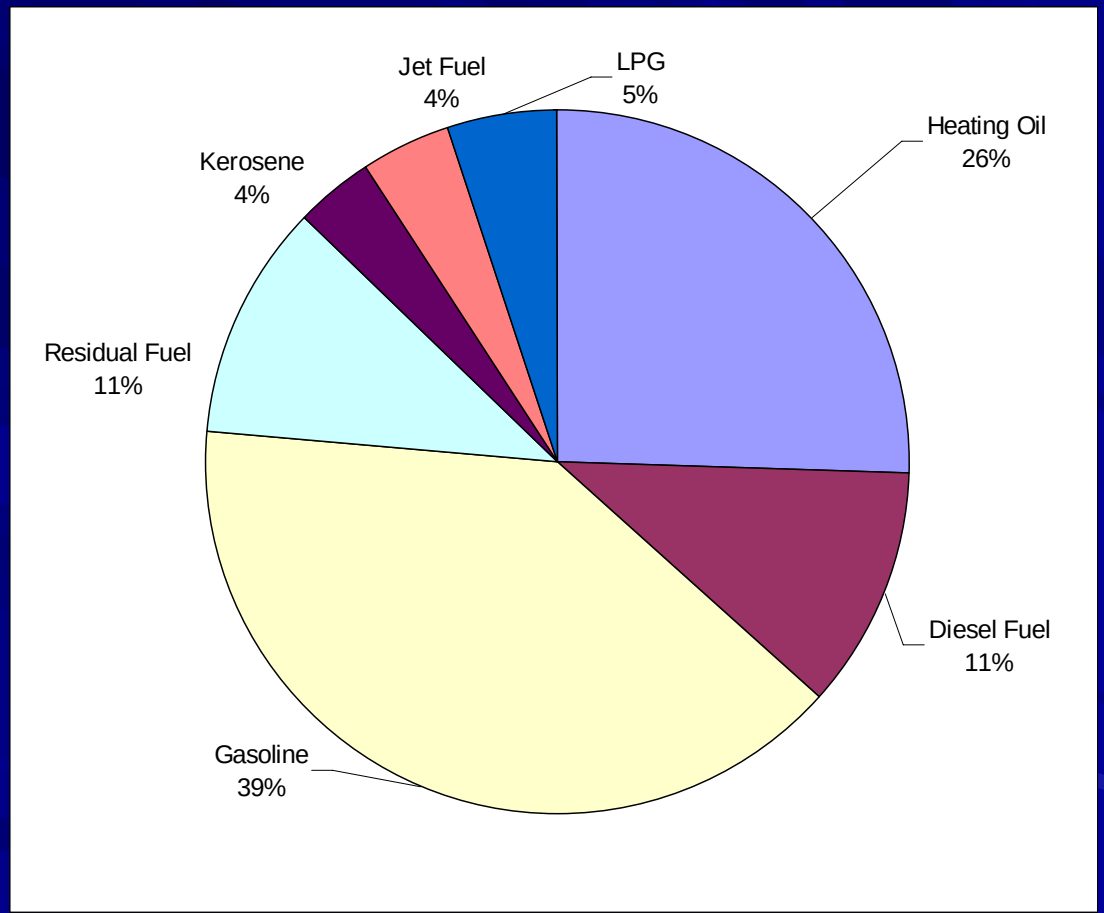


Data: Maine Office of GIS

Data: Maine Office of GIS

Maine Petroleum Consumption,
2006

Millions of Gallons	
Heating Oil	457
Diesel Fuel	197
Gasoline	714
Residual Fuel	189
Kerosene	67
Jet Fuel	75
LPG	88
Other	12
Total	1,789

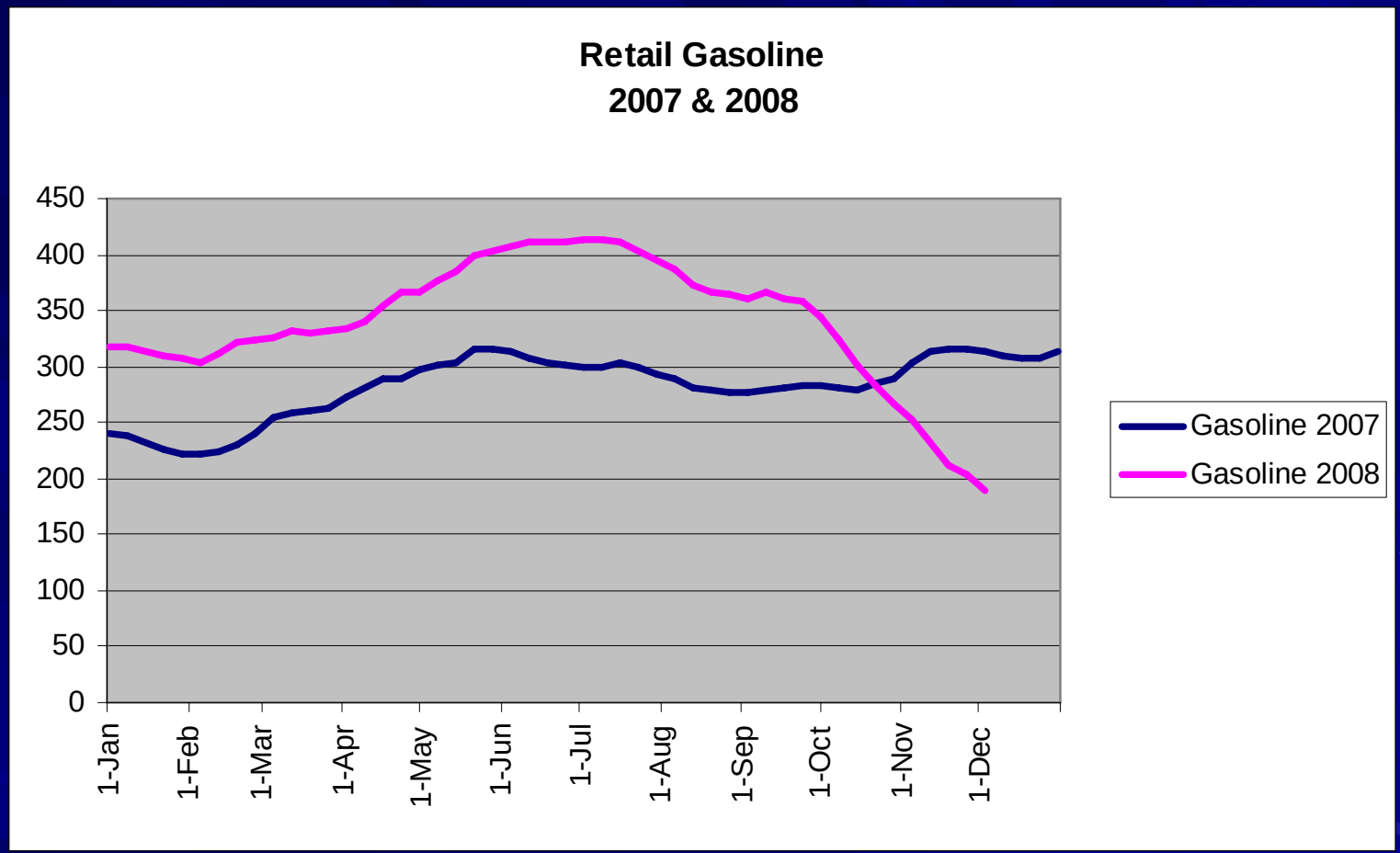


Source: EIA

Gasoline Prices

Estimated 2006 Consumption:

714 Million Gallons



Source: EIA

What is the REAL cost to Maine for Gasoline:

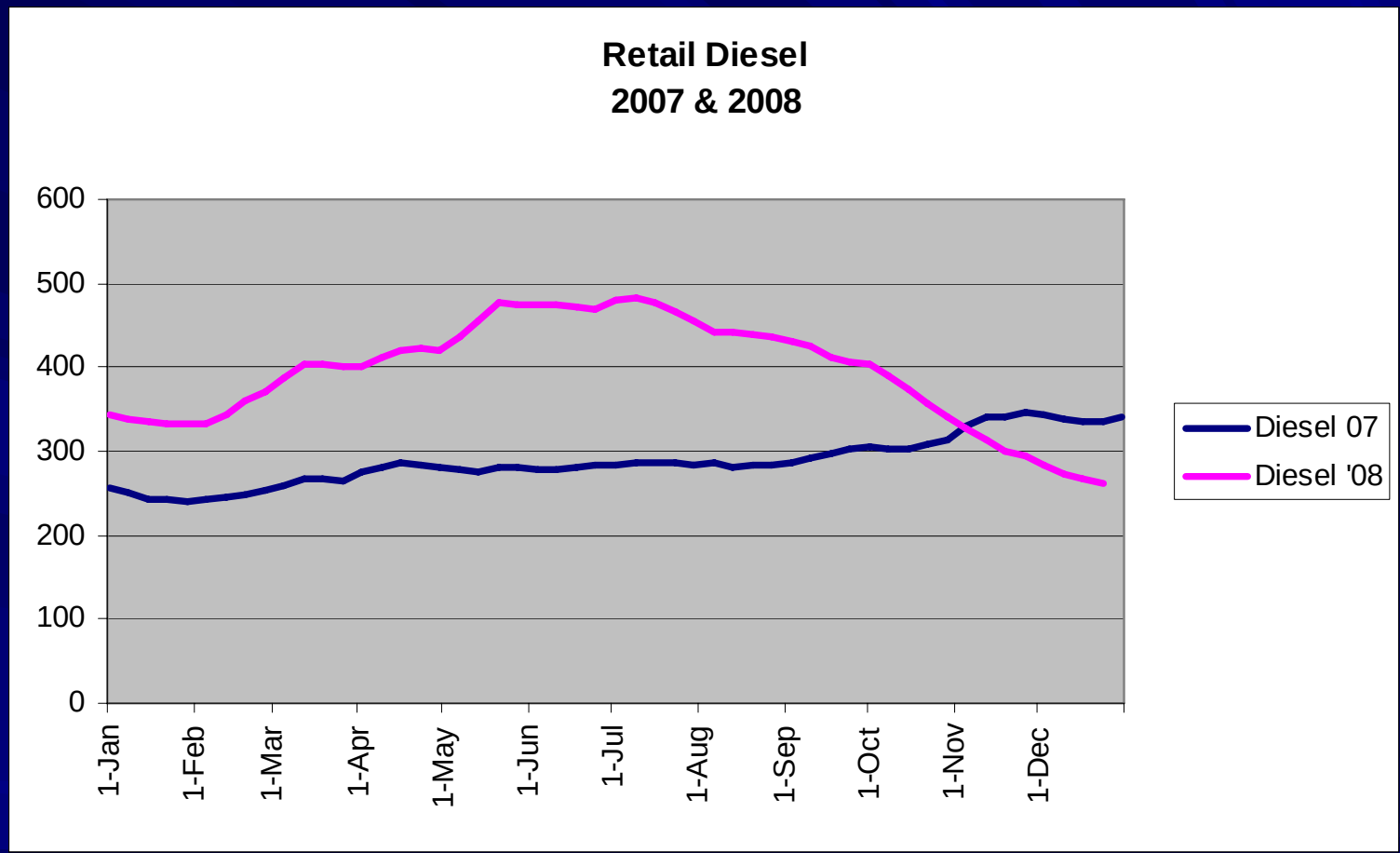
Price/Gallon (2008)	Total Cost (2008)	Dollars Exported (-85%)
$1.74 (lowest price in 2008)	$1.24 Billion	-$1.05 Billion
$3.31 (Average price in 2008)	$2.3 Billion	-$2.01 Billion
$4.14 (peak price in 2008)	$2.94 Billion	-$2.51 Billion

Based on EIA data and OEIS estimates

Diesel Prices

Estimated 2006 Consumption:

197 Million Gallons



Source: EIA

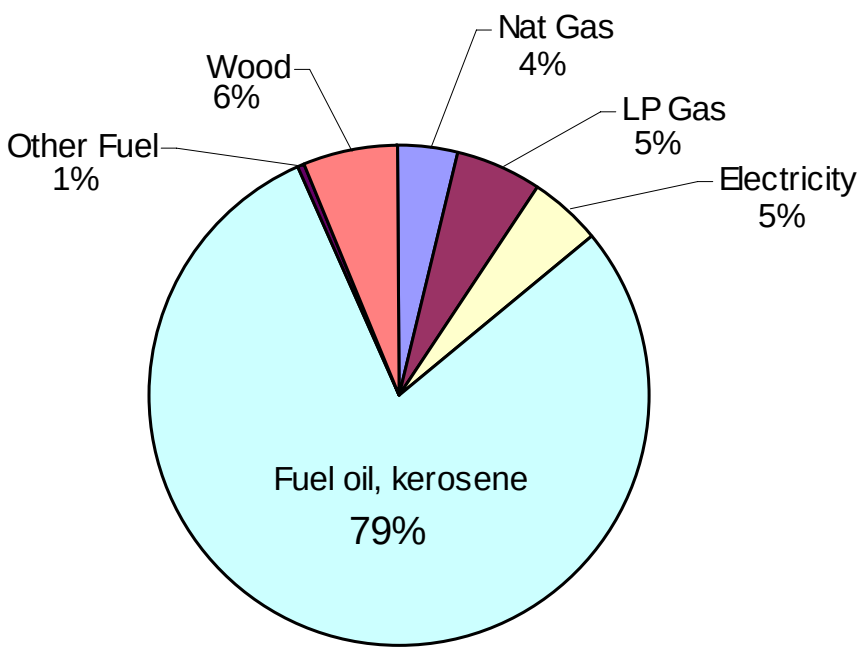
What is the REAL cost to Maine for Diesel:

Price/Gallon (2008)	Total Cost (2008)	Dollars Exported (-85%)
$2.63 (lowest price in 2008)	$519 Million	**-$441 Million**
$3.94 (Average price in 2008)	$778 Million	**-$661 Million**
$4.80 (peak price in 2008)	$948 Million	**-$805 Million**

Based on EIA data and OEIS estimates

Home Heating

The Average Maine Home Burns:
1009
gallons of
Heating oil a year

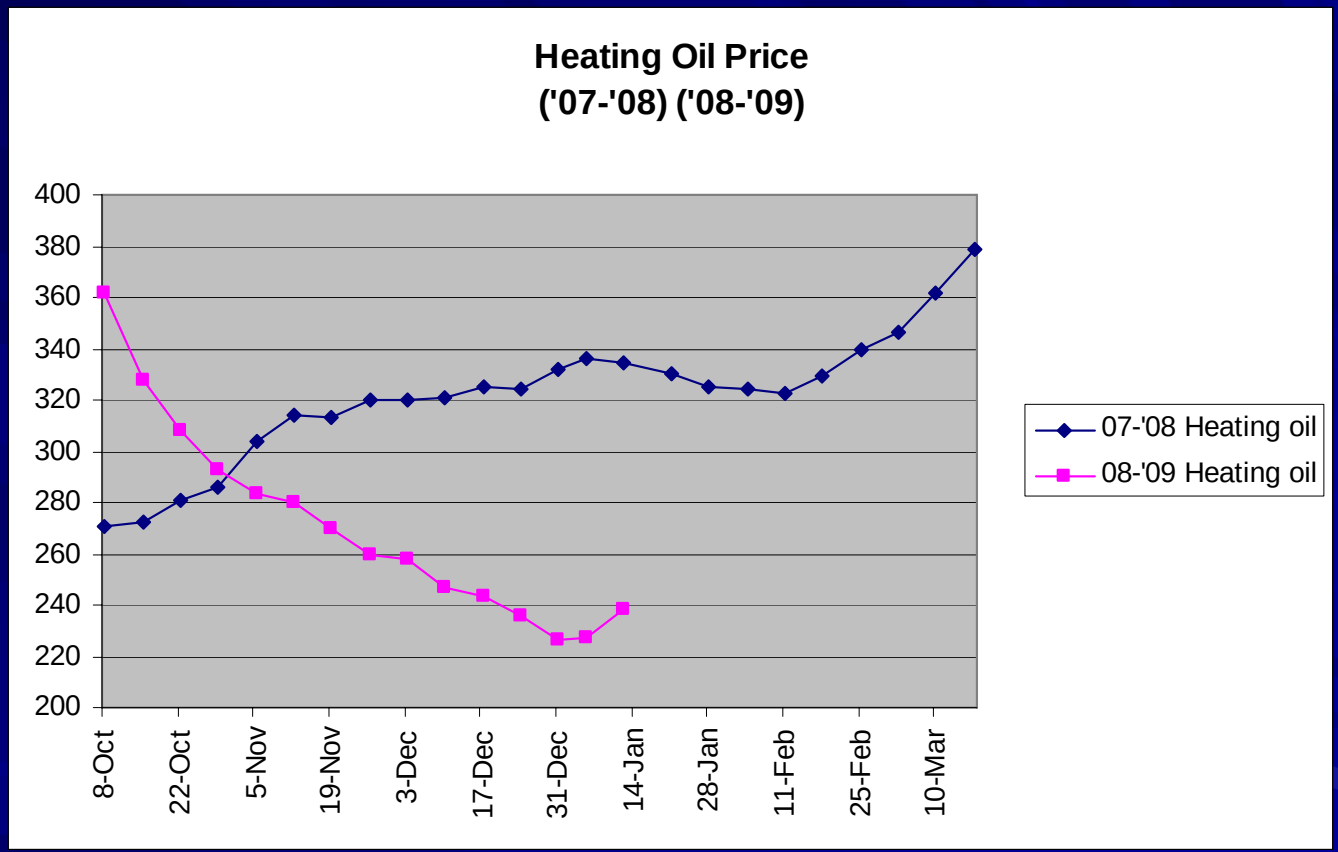


Source: U.S. Census Bureau, 2003, American Community Survey Summary Tables

Heating Oil Prices

Estimated 2006 heating oil consumption for all sectors:

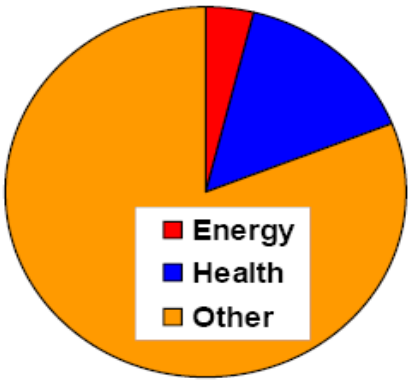
457 Million Gallons

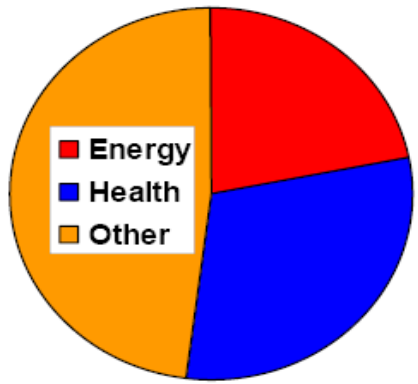


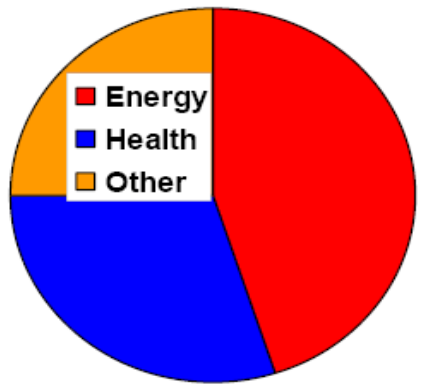
What is the REAL cost to Maine of Heating Oil…

Price/Gallon (2008)	Total Cost (2008)	Dollars Exported (-85%)
$2.26 (Lowest price in 2008)	$1.03 Billion	-$879 Million
$3.34 (Average price in 2008)	$1.53 Billion	-$1.3 Billion
$4.74 (peak price in 2008)	$2.15 Billion	-$1.83 Billion

Based on EIA data and OEIS estimates







"Energy" =
50% Transportation
40% Heating
10% Electric Power

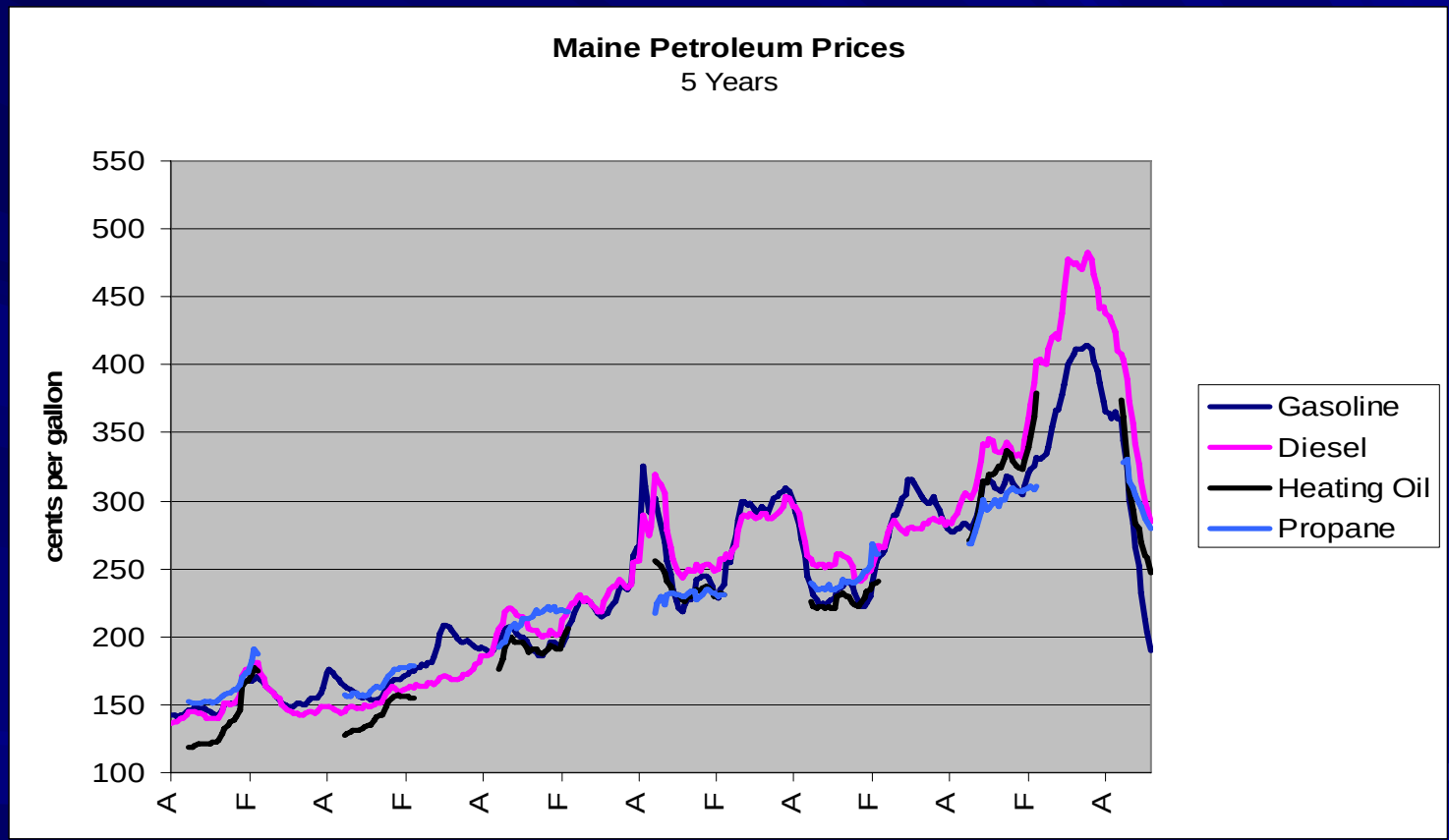
This makes optimistic assumption that health care costs do not grow past 30% of the average family's budget in 2008-2018

Ocean Energy Institute

Fuel Type	Fuel Price Per Unit (dollars)	units	Appliance type	Efficiency Estimate	Fuel Price Per Million Btu (dollars)
Geothermal Heat Pump	$0.166	kw/hour	Geothermal Heat Pump	350%	$13.90
Natural Gas	$1.17	therm	Modern Boiler	85%	$15.00
Cord Wood	$250.00	Cord	Modern Stove	70%	$16.23
Natural Gas	$1.17	therm	Average Boiler	78%	$18.00
Air-Source Heat Pump	$0.166	kw/hour	Air-Source Heat Pump	240%	$20.27
Cord Wood	$250.00	Cord	Average Stove	54%	$21.04
Pellets	$275.00	Ton	Modern Stove	75%	$22.22
Pellets	$275.00	Ton	Average Stove	60%	$27.78
Fuel Oil (#2)	$3.34	Gallon	Modern Boiler	85%	$28.33
Fuel Oil (#2)	$3.34	Gallon	Average Boiler	73%	$32.99
Propane	$3.02	Gallon	Modern Boiler	95%	$34.81
Propane	$3.02	Gallon	Average Boiler	78%	$42.39
Electricity	$0.166	kw/hour	Baseboard/Room Heater	100%	$48.65

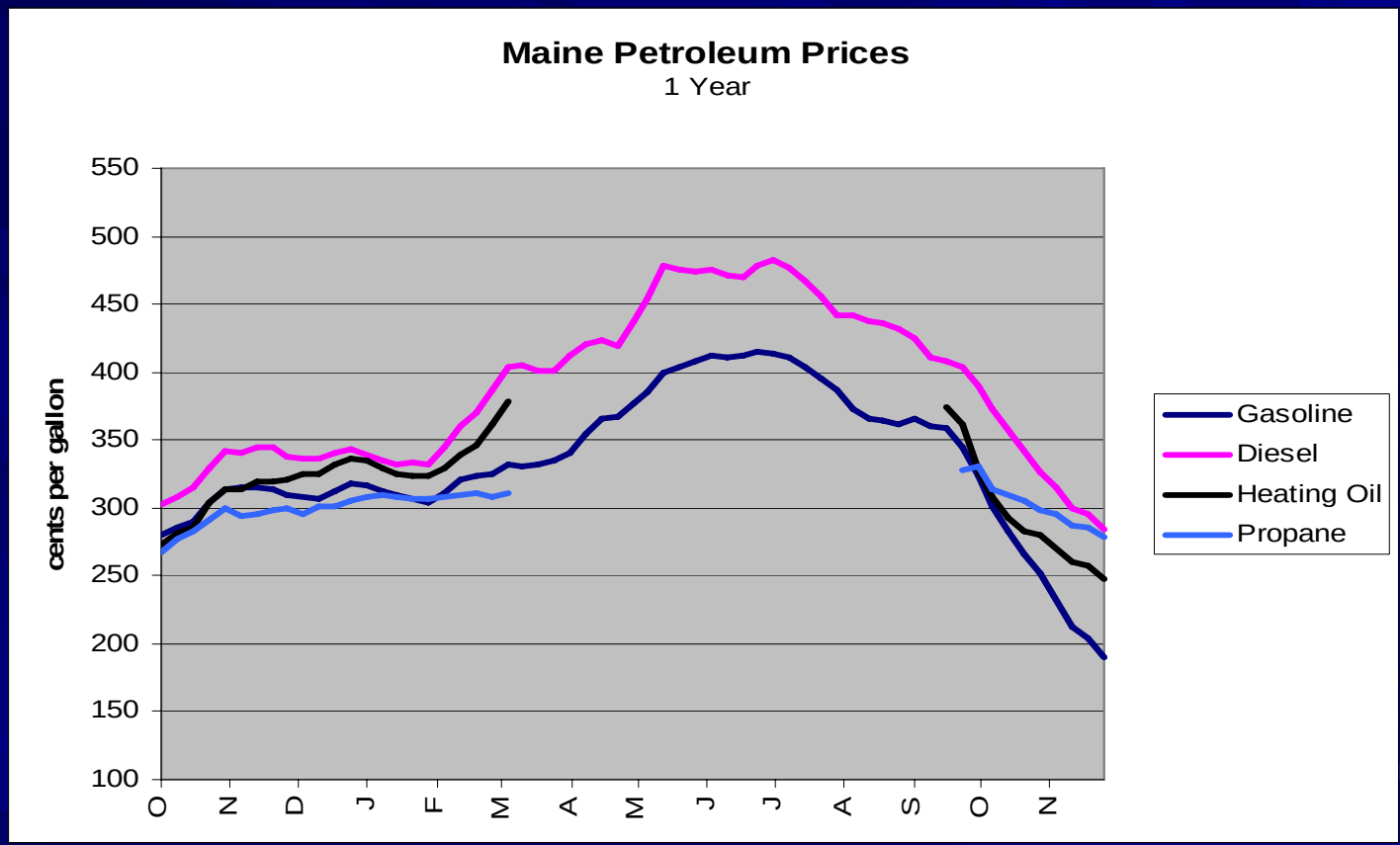
Based on 2008 Average Prices

Petroleum Prices



Source: EIA

Petroleum Prices



Source: EIA

What is the REAL cost to Maine All Petroleum:

Price/Gallon (2008)	Total Cost (2008)	Dollars Exported (-85%)
$30 Barrel (Lowest price in 2008)	$ 3.8 Billion	-$3.32 Billion
$100 Barrel (Average price in 2008)	$5.97 Billion	-$5.077 Billion
$147 Barrel (peak price in 2008)	$7.72 Billion	-$6.56 Billion

Based on EIA data and OEIS estimates

At Peak Price In Millions of Dollars

	$/gal	Mil. Gal.	spent	85%	15%
Heating Oil	$4.70	457.8	$2,152	$1,829	$323
Diesel	$4.80	197.4	$948	$805	$142
Gasoline	$4.14	714	$2,956	$2,513	$443
Propane	$3.75	189	$709	$602	$106
Residual	$2.70	67.2	$181	$154	$27
Kerosene	$4.90	75.6	$370	$315	$56
Jet Fuel	$4.00	88.2	$353	$300	$53
Other	$4.00	12.6	$50	$43	$8
			$7,719	**$6,561**	**$1,158**

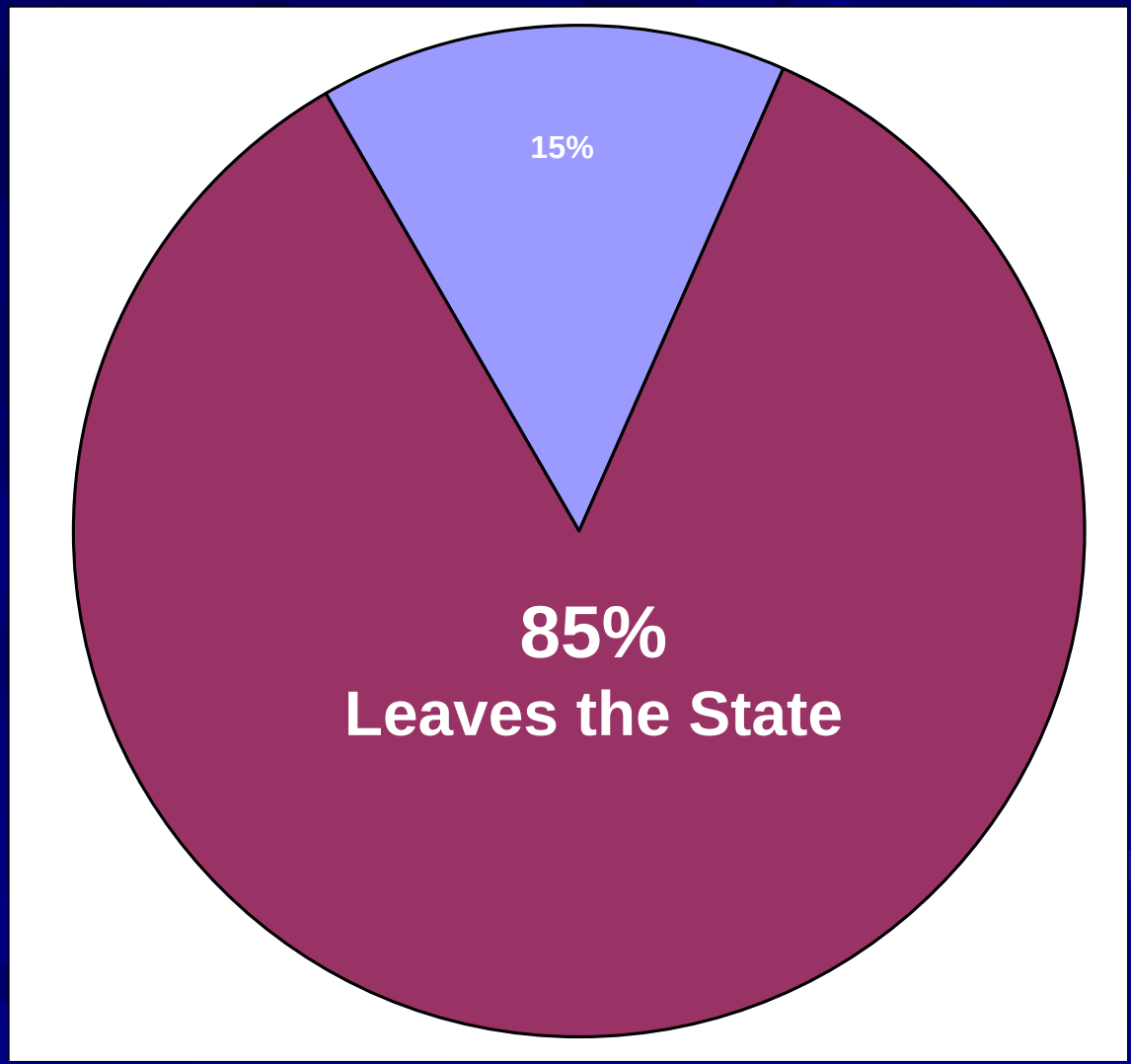
2008 Average Prices In Millions of Dollars

	$/gal	Mil. Gal.	spent	85%	15%
Heating Oil	$3.34	457.8	$1,529	$1,300	$229
Diesel	$3.94	197.4	$778	$661	$117
Gasoline	$3.31	714	$2,363	$2,009	$355
Propane	$3.02	189	$571	$485	$86
Residual	$2.00	67.2	$134	$114	$20
Kerosene	$3.90	75.6	$295	$251	$44
Jet Fuel	$3.00	88.2	$265	$225	$40
Other	$3.00	12.6	$38	$32	$6
			$5,973	**$5,077**	**$896**

Lowest Prices for 2008 In Millions of Dollars

	$/gal	gallons	Expenditure	85%	15%
Heating Oil	$2.26	457.8	$1,035	$879	$155
Diesel	$2.63	197.4	$519	$441	$78
Gasoline	$1.74	714	$1,242	$1,056	$186
Propane	$2.79	189	$527	$448	$79
Residual	$1.10	67.2	$74	$63	$11
Kerosene	$2.90	75.6	$219	$186	$33
Jet Fuel	$1.90	88.2	$168	$142	$25
Other	$2.00	12.6	$25	$21	$4
			$3,809	**$3,238**	**$571**

Petroleum expenditures effects on Maine's economy



The "Petro-Dependence Tax"

- Based on Bureau of the Budget estimates the total tax revenue for Maine in FY 08:
  - **$3.04 Billion**
- Based on Bureau of the Budget estimates the personal income tax for Maine in FY 08:
  - **$1.4 Billion**
- Based on Bureau of the Budget estimates the yearly corporate tax for Maine in 08 :
  - **$182 Million**

Estimated "Petro-Dependence Tax" on ALL Maine Citizens, Business and Industries in 2008:

-$5 Billion

What if…

- We saved 10% of our expenditures on petroleum products in 2008:
  - 10% of the estimated $5,000,000,000 is…
  - $500,000,000 remains to preserve the jobs for Maine workers and to be invested by businesses and industries.

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http://www.maine.gov/oeis/index.html